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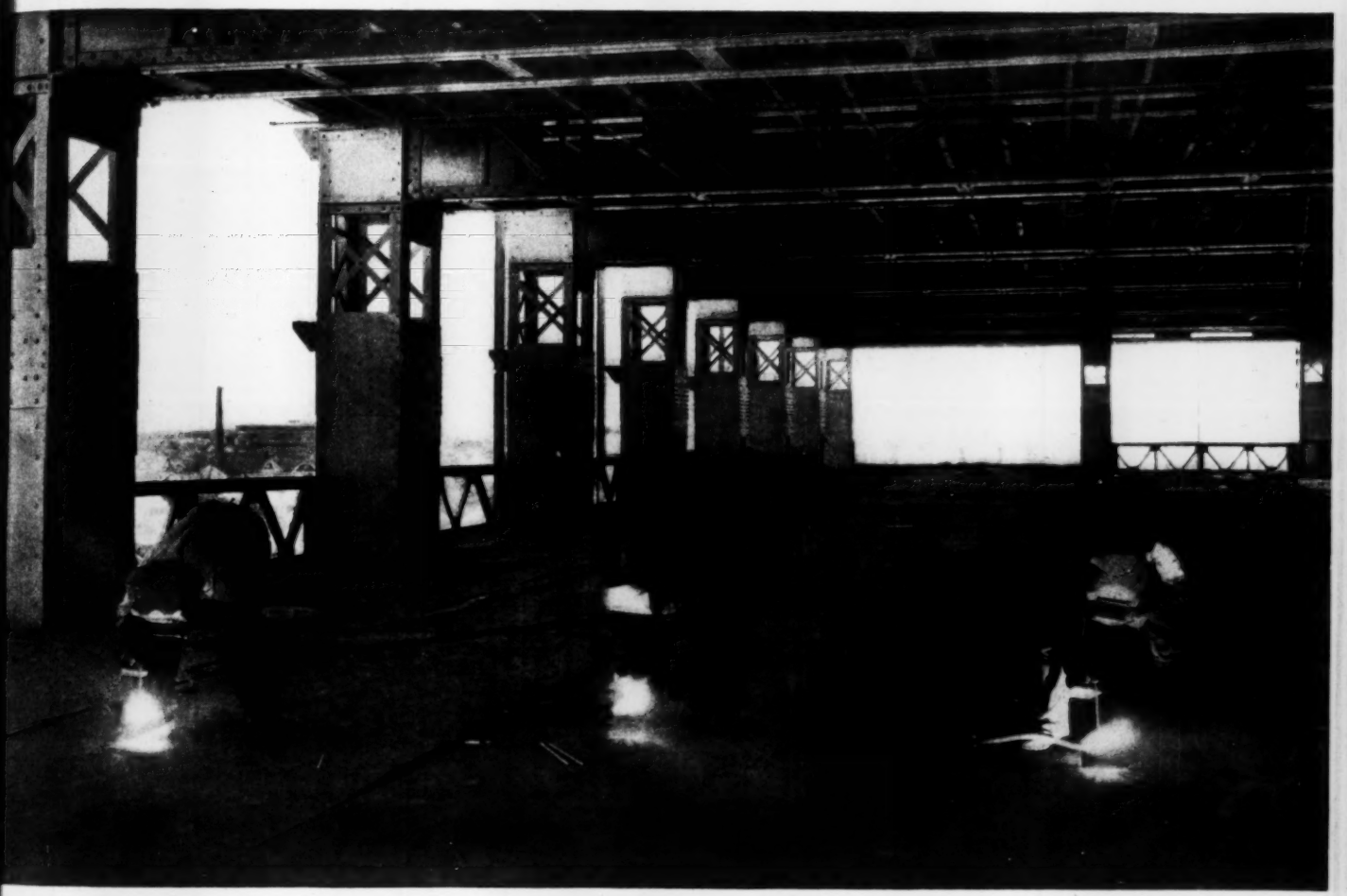

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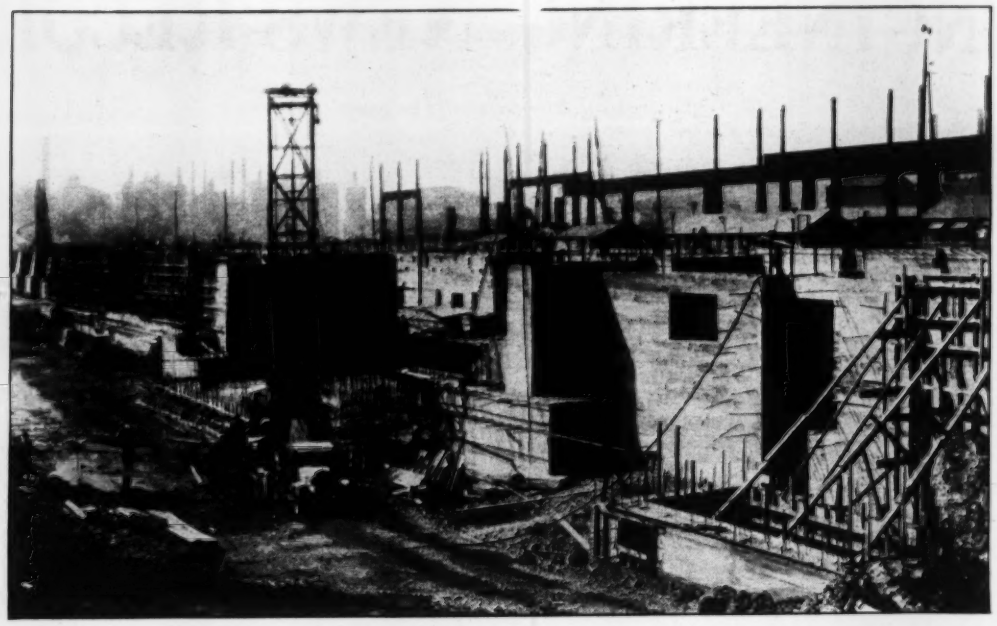

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DEVOTED TO CIVIL ENGINEERING AND CONTRACTING

F. E. SCHMITT, *Editor*

Volume 105 NEW YORK, DECEMBER 4, 1930 Number 23

Public Toll Plan Strengthened

A HIGH court decision has given approval to the project for building the Triborough bridge and the Thirty-eighth Street tunnel in New York as municipal toll facilities. Its effect is to strengthen the plan of user payment for public works that otherwise would be difficult to finance and would burden the general tax scheme. The public toll plan has been used in many instances before now, and in effect every municipal water service operates by virtue of user payment. Nevertheless the decision is important because it removes some of the remaining doubts that have held back wider application of the method especially to traffic facilities, which to many seem to require free operation in their very nature. Present conditions make user payment for improved major links of traffic practicable, and thoroughly acceptable if carefully limited in number of applications and if restricted to the amortization period. Danger lies only in throttling the transportation system by too many toll barriers and in perverting the toll system to a general excise device.

Road Show Ruminations

AS THE season for another road show approaches, one is led to speculate on what changes and advances will be revealed in road-building equipment and materials in this year's exhibits. Will they reflect the intense interest in road construction so apparent on every hand? Can they measure up to the needs of one of the greatest of modern construction activities? With the remarkable developments of past years in road-building products in mind, the perplexity indicated by the above questions may seem paradoxical—at least fantastic if not impertinent. It results largely from impressions gained at the show last year, a show which, while the greatest of road exhibits in point of size, was the most disappointing in reflecting actual accomplishment. Fewer new machines were presented than at any show of the preceding five years. Exhibits were barren of products with radically new possibilities; even improvements in standard machines were few in number. Perhaps the advances of other years had created too great expectations. Or perhaps progress had run ahead of the needs of practice. If either of these possibilities be true, there is little cause for concern. But if there is a general feeling among manufacturers of road-building equipment and materials that their products are not susceptible of further perfection, an unhealthy situation exists. For road construction in this country and perforce road equipment development have only begun. In the past the manufacturers of road equipment and materials have served the industry so conspicuously that much of the advance in the highway field can be traced direct to their drawing boards. Their leadership has by no means been lost even though last year's show seemed to indicate that it might be somewhat less effective. The 1931 show in St. Louis will provide a better perspective. May it be the most progressive show in years!

Dam Evolution

SIMPLE structures when thoroughly studied prove to contain as many complexities and engineering difficulties as the most intricate. This is true not only of the simple beam or the plate girder but also of the masonry gravity dam, as reflected in many elaborate investigations. Dams, which are more or less constantly in the limelight, present the dual problem of achieving greater safety and at the same time greater economy. In the matter of the former we have to deal with large uncertainties of stress distribution, with doubts as to the nature of the resisting action, especially when shrinkage cracks disrupt the mass, and with the uplifting and separating forces exerted by the pressure of leakage water within the mass and under its foundation. New thinking has recently been applied to both problems, the former as represented in the refined calculations developed by the Reclamation Bureau in the so-called trial load method, the latter in the development of new forms of structure. This latter evolution is a highly notable, perhaps an epoch-making, event in the history of dams. The subdivided or semi-buttress type adopted for the Don Martin Dam a year or two ago is a notable example of evolution of new forms. F. A. Noetzli now carries the analysis of new forms farther in an interesting study of the field lying between full gravity and thin-walled buttress dams. His presentation of the subject promises to remain a contribution of basic merit, for the new forms set forth are a step toward both economy and safety. With strong, tight foundation rock—an indispensable condition—they open new prospects in future dam construction.

Setting New Styles

THE importance which modern industry attaches to research is nowhere better exemplified than in the splendid buildings that are being provided to house the research staffs. As might be expected, many of these structures give expression in their design and construction to the imaginative, progressive thinking that their existence symbolizes. At East Pittsburgh the new general engineering laboratory of Westinghouse, utilizing a completely welded steel frame of eleven stories, is an outstanding expression of a modern development. At New Kensington, Pa., the striking facade of the Aluminum Company's research laboratory is emblematic of a modern architectural effect made possible by the use of aluminum for spandrels, copings and decoration generally. The latest and most thought-provoking structure to be dedicated to industrial research is the building just completed in Milwaukee by the A. O. Smith Corporation. A leader in the drive toward mechanization of manufac-

turing processes, this organization has here blazed some new trails for structural engineers to explore. Built for a single purpose, the new research building embodies innovations which may not seem to have much application in the general building field, where a wide diversity of possible uses must be considered. But at least the omission of interior columns is something to consider, and the utilization of hollow columns and girders as pipe and conduit shafts similarly commands attention. The use of dust-tight windows nearly a full story in height and of forced ventilation is a valiant attempt to find satisfactory solutions of a general problem. Lightweight steel-plate floors with concrete or wood-block wearing surfaces constitute another feature of interest. All in all the description of this remarkable structure should be read with an open mind. It is a story not of a specialty building but of a structure that contains many stimulating departures from precedent.

Improving Harbor Design

RECONSTRUCTION of harbor entrances on entirely new plans is an important part of the government's present work in improving certain Lake Michigan ports in order to provide greater safety and facility of navigation, especially for the cross-lake car-ferry traffic, which is maintained throughout the year. An easily accessible entrance, important for any harbor, is particularly valuable where severe storms and ice conditions are factors to be considered, as on the Great Lakes. Many of the old entrances are difficult for modern traffic of large vessels. The reconstruction therefore represents distinct progress in making shipping facilities more efficient.

The particular ports at which the new works are being constructed lie on the east side of the lake. It is characteristic of the ports on this side that they are inland, being situated on rivers which break through the sand hills forming the coast line. The old type of entrance, built more than half a century ago, consists of a dredged channel flanked by parallel piers about 200 ft. apart and extending some 1,500 ft. into the lake. Large ships must approach such a channel practically in an axial direction, not an easy feat in stormy or foggy weather, when ice fields fill the lake.

In the new type of entrance the long parallel piers are replaced by breakwaters converging from the shore to form a triangular or arrowhead bay about half a mile in width and base, with a 400-ft. opening between the heads. This arrangement provides an entrance width twice as great as the old, and does away with the long narrow channel, so that steamers have an open stretch of smooth water in which to make their way to the river mouth forming the passage into the harbor proper.

This type of harbor is not wholly new on Lake Michigan, but its merits received only slow recognition. Its first application, on a small scale, was at Sturgeon Bay Canal, Wisconsin, authorized in 1873. The next, also small, was not made until 32 years later, at Holland, Mich. (1905). Two years after this the first large harbor of the arrowhead type was built, at Manitowoc, Wis. It was followed by others at Racine, Wis., and Ludington, Mich. At present two are under construction, at Frankfort and Muskegon, Mich. Four of the ports named are on car-ferry routes; their modernization is an indication of the importance of the cross-lake car-ferry traffic as a link in rail transportation between eastern points and the Northwest.

Road Work as Relief

AFFAIRS have developed to the point where increase of public-works construction is the only feasible and promising means in sight for relief of unemployment. The upturn in private business activity goes on slowly, too slowly to prevent distress for some months to come. If an early expansion of the public-works program can be brought about, not only will unemployment be relieved but business recovery will be stimulated.

Road construction, evidently, is the chief reliance among public works. It is the largest single item in both money and number of workers, and it is the only one capable of great increase. Buildings, river improvement, new municipal or state services, or such special undertakings as the Boulder Canyon project, are not adapted to be of material help in the present circumstances; but the road program can be speeded up very greatly.

Since last spring there has been a great deal of talk about the desirability of road work, but only limited action. The federal-aid appropriation for the fiscal year now half over was increased by two-thirds, from $75,000,000 to $125,000,000, and the same increase was fixed for several years to follow. A number of states hastened their 1930 construction program, but without increasing it greatly, indeed without taking up their full allotment of federal-aid funds; the chief effect was to complete the work earlier and leave the latter part of the year with less than normal road activity. The Bureau of Public Roads allocated next year's federal-aid funds far ahead of the usual time, hoping that the states would thereby be encouraged to make an advance beginning on the coming season's program in spite of many difficulties in the way of such action. This expresses substantially all that has been done toward increasing the volume of work on the main road system. Improvement of local roads, on the other hand, being dependent wholly on local funds, may not increase materially.

Under these circumstances it is a matter for serious thought what should be done to bring about the needed large increase in road construction, beginning at the earliest possible date. In order to make the situation clear, the pertinent facts are presented on the opening pages of this issue in an interview with Thomas H. MacDonald, federal highway chief. One noteworthy item brought to light is the discrepancy between the aid money available to the states and the amount which they actually have taken up, a discrepancy due in part to the unwillingness of many states to authorize bond issues or appropriations large enough to meet the federal-aid allotments. These and other facts point to certain obstacles that must be surmounted if the hope of increasing road work is not to be completely illusory.

The country's program of main road improvement is still so far from completed that the annual working rate could be increased very greatly without waste, and in fact to the advantage of transportation economy. Under the present law, which requires the states to contribute more than half the improvement cost, so much local burden is imposed that the difficulty of obtaining the cooperation of the states in effective increase of the year's program is most serious. Were the application of the next two years' federal-aid allotments freed of this limitation, under suitable safeguards, the increase in work could readily be made effective. Amendment of the present federal-aid laws is necessary for this purpose.

Federal funds cannot now be used for local road work, but must be confined to the adopted federal or main

network of roads. This is a sound and necessary provision—for normal times. But however objectionable any diversion of federal funds to improvement of secondary or tertiary roads may be in principle, the present emergency puts a different face on the matter. A vastly larger amount of work remains to be done on these minor as on the main roads, with fully as great return in the form of reduced transportation costs. If a sound method could be found for stimulating the improvement of local roads during the coming season or two by some measure of assistance from federal funds, the effect in meeting the day's need would be even greater than could be accomplished in the field of main roads. This again requires amendment of the existing laws as an emergency matter.

No advance plans have been made up to now for the necessary action to convert into reality the ideal of bringing about quickly a large increase in road construction. If the talk about unemployment relief through public-works expansion is to be anything more than idle talk, definite planning for increasing road work needs to be taken in hand at once. Congress has the primary responsibility. Effective action by the national government will not, we believe, find the states and local communities unresponsive.

Filter Sand

NEARLY forty years ago the late lamented Allen Hazen developed and presented to the engineering profession the conception of "effective size" as an index of the hydraulic transmission capacity of a bed of sand. That index, defined as the grain size that is exceeded by 90 per cent of the material, has now become a household word in water plants. It has been valuable indeed as a basis for specifications for filter sand and for computing the transmission capacity of soils. But the present state of the art should now be re-examined to see if this valuable index is being applied to conditions for which it was not originally designed.

The investigations at the Lawrence Experiment Station which gave birth to the term "effective size" simulated as perfectly as a careful experimenter found possible the conditions under which a slow sand filter operated, not only in regard to rate of flow and depth of bed but also in regard to the character of the filtering material. The sand was homogeneous, similar to that in a state of nature with variations in size uniform throughout.

When the rapid filter of today is compared with its slowly operating predecessor, differences of both degree and kind become apparent. The most obvious difference, of course, is that the rate of filtering flow has been tremendously increased. But no less important is the decided change that has taken place in the filter material itself. In the present-day rapid filters the sand bed inevitably becomes stratified by the flotation effect of the high-rate washing, more perfectly than could be done by any purely mechanical method. If inconsequential variations be ruled out, a horizontal plane cut through a rapid filter bed would encounter grains all of the same size. The finer particles do not place themselves between the larger grains. The sand is a far different material from that used at Lawrence.

Early in the development of rapid filtration, rakes were used to loosen the accumulated material, and wash water was utilized for floating it into the wash troughs. A relatively low rate of application of water was satisfactory for that purpose. Under those conditions, stratification could hardly attain serious proportions. When compressed air was substituted for the rakes, conditions in this regard were not materially changed; wash rates were still too low to stratify the sand materially. Later, however, reliance upon wash water alone to scour the filter and remove the mud called into existence washing rates much higher than had previously been used and at the same time shelved the other agitating processes, which had tended to prevent stratification. A substantial degree of flotation is today considered essential to washing, and the sand bed now becomes completely stratified.

There have been many intimations in recent years that water-works engineers are not entirely satisfied with the application of the Hazen index to rapid filters. The chairman of the filtering materials committee of the American Society of Civil Engineers has suggested the use of an index approaching the minimum size grain—that is, the size of the particles lying on the top of the filter bed. Regardless of what merit there might be to this suggestion or to any other proposed, it is in order to question the applicability of an index to conditions so far removed from those on which that index is based.

Studies carried out in Detroit two years ago proved satisfactorily that the behavior of the sand bed during the washing process is dependent upon the grain size that is exceeded by only 70 per cent of the whole. It is noteworthy that the specification now being prepared in that city for the sand for the new Springwells filter plant sets allowable limits for this size as well as for the more usual effective size and uniformity coefficient. In this way it is expected that the sand obtained, in addition to having the desired filtering qualities, will be capable of being cleaned adequately with the designed wash water system.

Uniformity coefficient has long been used as a companion index to effective size in describing the size characteristics of granular material. Wide limits of grading have long been considered undesirable, so that specifications have usually stated the maximum uniformity coefficient allowable. A lower limit for uniformity has been set most infrequently. In this connection, however, attention should be called to the recent experiences in St. Louis in placing in operation the new Howard Bend plant. The specifications for the purchase of the filter sand for that plant were written with the general characteristics of Mississippi or Missouri river sand in mind. But instead, a more uniform sand was obtained, which, although conforming to the specifications as to effective size, did not contain sufficient quantities of large-sized particles to enable it to be supported properly by the fine gravel. As a result the sand itself passed down into the gravel layer, completely destroying the value of the bed as a filtering agent. In one bed a crater 8 ft. in diameter developed, extending down through the entire depth of the sand. Considerable labor and expense became necessary to insert a thin layer of coarse material between gravel and sand to give proper structural support.

Despite the developments and changes that have taken place in the practice of water purification, filtration through sand is still defined and described in terms which possibly no longer apply. Research and careful observation are slowly yielding more complete understanding of the behavior of filters. But it is clear that all is not yet known about even such a familiar material as filter sand. There is still ample opportunity for engineering research to render service to the water-works profession.

Accelerating Road Construction

Employment of More Than 200,000 Additional Men This Year by Increased Highway Work Promises Extensive Help in Unemployment Relief in 1931 With Aid of Suitable Legislation

BRINGING OUT the present facts of road-work expansion, Thomas H. MacDonald, chief of the Bureau of Public Roads, in an interview with Paul Wooton, Washington correspondent of *Engineering News-Record*, outlines the record of work accomplished in 1930 and the factors governing 1931 highway work.

More than $150,000,000 of federal road money is anticipated to date and is available for the work of the next eighteen months. Removal of the $15,000 per mile limitation on federal aid and provision for advancing money to the states until they can repay their share are essential legislative changes now projected to enable next year's work to go ahead promptly at full speed. There are many possibilities for productive winter work. —EDITOR.

MEN EMPLOYED directly on highway work in 1930 numbered at least 75,000 more than in 1929. The figures of actual accomplishments during 1930 demonstrate very clearly that the acceleration of highway construction is a particularly effective method of relieving unemployment.

For each man engaged in actual construction, three others are employed at least part time in supplying him with materials and equipment. Thus, the total gain in employment exceeded 200,000. This was a widely distributed benefit, for road work has the advantage of offering employment in practically all local communities; it furnishes a market for local materials and decentralizes the release of funds into the channels of trade. All told, 1930 highway work is estimated to have furnished employment to 300,000 men directly on the roads, and in all nearly 1,000,000 persons. The President has just proposed that temporary advances of federal-aid money be made to the states. If this proposal is put into effect it is expected to result in a material increase in construction on the federal-aid or per cent system of roads. Further, if Congress will remove the present requirement that federal aid must not be greater than $15,000 a mile a still greater acceleration will be made possible.

MacDonald's Views

Thomas H. MacDonald, the engineer who is at the head of the United States Bureau of Public Roads, is convinced that no better means of stimulating employment, through public works, can be found than road building. "Probably not less than 75 per cent of the cost of the finished highway eventually is represented by labor," said Mr. MacDonald in an interview. "Moreover," he continued, "common labor forms a large proportion of the forces used for road work and for supplying the raw materials used. As there are roads to be built or improved in practically every county in every state, the relief afforded is not confined to a few centers of population.

"Despite all the work that has been done on public roads since the advent of the automobile there remain no less than 2,000,000 miles in need of some sort of improvement. If this almost interminable task can be accelerated beyond the normal rate to take up any slack in employment it has the double purpose of providing additional public facilities that in themselves make for additional permanent employment, because improved transportation opens new production possibilities.

"Safeguards thrown about public funds make it difficult for the states to expand expenditures beyond the fixed rate. One of the arguments against loans of federal funds to states is that, in case the state for any reason were to decline to make settlement, the federal authorities would have no way to enforce repayment. This objection cannot be raised properly against advance financing of highway construction. The money is to be available for a brief period only until the states can arrange for additional funds. The amount advanced can then be repaid, or funds can be withheld in any desired amount from future allocations of federal funds."

Funds Available for Roads

Over $150,000,000 of unobligated federal-aid funds will be reposing in the United States treasury on Jan. 1, if Congress makes immediately available funds that otherwise could not be drawn against until July 1. If road building is to be speeded up during the next few months it is obvious, however, that the federal government must supply temporary financing. Plans to that end are in the making. Whatever amounts in excess of 50 per cent of the cost of the project are used by the states might be repaid or deducted from federal-aid payments after the emergency will have passed.

The present status of the highway appropriations and authorizations is complicated. It covers a $300,000,000 program in all stages of completion, extending into three fiscal years. There is no earmarking of dollars. Bills are paid regardless of the year in which contracted. The only requirement is that the state may not draw federal funds in excess of its total allotment to the end of each fiscal year.

The unobligated total on Nov. 1 was $162,260,000. This was made up of unobligated balances, as shown in detail in the table published herewith, as follows: for the fiscal year ended June 30, 1930, $2,200,000; for the fiscal year to end June 30, 1931, $40,600,000; for the fiscal year to end June 30, 1932, $119,180,000.

The money for the current fiscal year, which ends June 30 next, consists of the original appropriation of $75,000,000 and the latter appropriation of $50,000,000. Of the former amount 18.5 per cent had not been obligated on Nov. 1. Of the latter appropriation the unobligated balance amounted to 55.2 per cent. On Nov. 1 only 2.2 per cent of the money for the fiscal year to end June 30, 1932, had been obligated. Actual payments from this latter appropriation ordinarily would

not begin until July 1, 1931, but early approval is expected of a bill making it possible to begin payments at once.

Where the States Stand

As the situation stands at present, only twelve states are likely to be in a position within the next six months to draw on next year's funds, if no emergency legislation, including temporary financing, is passed. They are: Delaware, Iowa, Ohio, Oklahoma, Oregon, Pennsylvania, South Carolina, Rhode Island, Vermont, Virginia, West Virginia and Wisconsin.

Because of the unusually favorable working season this year, the states have depleted their own road-building funds to an unusual extent. In the twelve months to end Dec. 31 the states will have spent $925,000,000 for roads. Federal-aid roads constitute only a small part of the program.

If the $15,000 per mile limitation is removed promptly by Congress, it will have a most important bearing on the number of men who can be employed this winter and will provide employment in the areas most in need of relief. A considerable proportion of the unemployment is in industrial areas. It is in those very sections that there is need for the widening of roads and building bypasses. Samuel Eckels, of the Pennsylvania highway commission, has advised authorities in Washington that his state alone could absorb an additional $20,000,000 next year if the $15,000 limit is removed.

Another important argument for amending the law to that effect is that it would make it possible to start a large amount of work that can be done to advantage in cold weather. Because of the $15,000 limitation there are pending various projects involving heavy fills, extensive blasting or other form of expensive construction work. Removal of the $15,000 provision also will be helpful in the West and South, where work on heavy cuts and on roads crossing swamp areas is waiting.

As this is written, the only emergency fund that has been approved by the President is the $100,000,000 or $150,000,000 recommended in his message to Congress "to accelerate all construction during the next six months." It is known that his emergency committee has in mind a larger sum for roads alone. As no emergency fund for roads is carried in the new budget it is probable that later a supplemental estimate will be sent to Congress. The amount being discussed is $250,000,000. There is no thought that any such amount of additional road money could be absorbed during the next six months, but there are some states that could absorb their share of it. A few would not be able to utilize more than a part of the allocation.

Except for the financial limitation, the state highway commissions never were in as good a position to increase the volume of their work. Their organizations have operated at an unprecedented rate for a year.

Ready for an Active Year

In most states no difficulties would be experienced in permitting the use of more than 50 per cent of federal funds on roads. Laws enacted when federal-aid first became available purposely were made sufficiently broad to insure to the state the benefits of all federal money that might be appropriated. Federal legislation will be needed, and the President in his message to Congress says, "We need some authority to make enlarged temporary advances of federal highway aid to the states." The resolution providing this authority will limit advances to funds that can be expended before July 1.

The federal government in this transaction simply would act as a banker. It could advance the money on a 100 per cent basis. Fifty per cent of the total could be repaid by the states as their own revenues come in, or the amount could be deducted from a subsequent allotment of federal-aid funds. A concurrent resolution would be all that is necessary to authorize payments to the states in excess of 50 per cent, so that nothing complicated in the way of legislation would be required to make the money available.

UNOBLIGATED BALANCES OF FEDERAL AID FUNDS AVAILABLE FOR NEW PROJECTS AS OF OCT. 31, 1930

	1930 Apportionment		1931 Apportionment				1932 Apportionment		
			Original $75,000,000		Additional $50,000,000*				
State	Balance Unobligated	Per Cent	Balance Unobligated	Per Cent	Balance Unobligated	Per Cent	Balance Unobligated	Per Cent	Total Unobligated Balance
Alabama	$504,857	32.5	$1,557,372	100.0	$1,045,263	100.0	$2,615,434	100.0	$5,722,926
Arizona	.....	.....	.....	.....	692,538	97.1	1,768,023	100.0	2,460,561
Arkansas	.....	.....	.....	.....	578,020	66.6	2,174,786	100.0	2,752,806
California	.....	.....	.....	.....	438,194	26.1	4,181,212	100.0	4,619,406
Colorado	.....	.....	702,736	50.5	933,227	100.0	2,315,948	100.0	3,951,911
Connecticut	.....	.....	149,565	31.3	320,721	100.0	792,359	100.0	1,262,645
Delaware	.....	.....	.....	.....	8,211	3.3	609,375	100.0	617,586
Florida	.....	.....	528,110	57.3	618,511	100.0	1,543,232	100.0	2,689,853
Georgia	.....	.....	616,558	31.1	1,332,648	100.0	3,316,029	100.0	5,265,235
Idaho	.....	.....	.....	.....	164,819	26.3	1,554,594	100.0	1,719,413
Illinois	.....	.....	.....	.....	1,882,428	90.5	5,150,396	100.0	7,032,824
Indiana	.....	.....	857,269	44.9	1,281,511	100.0	3,172,253	100.0	5,311,033
Iowa	.....	.....	.....	.....	12,350	0.9	3,330,593	100.0	3,342,943
Kansas	.....	.....	.....	.....	985,160	71.7	3,397,874	100.0	4,383,034
Kentucky	.....	.....	.....	.....	.....	.....	1,937,610	82.2	1,937,610
Louisiana	.....	.....	154,869	14.9	698,144	100.0	1,745,445	100.0	2,598,458
Maine	.....	.....	324,895	48.1	453,080	100.0	1,121,860	100.0	1,899,835
Maryland	.....	.....	.....	.....	.....	.....	1,036,835	98.6	1,036,835
Massachusetts	.....	.....	622,181	57.1	731,547	100.0	1,813,916	100.0	3,167,644
Michigan	.....	.....	.....	.....	1,067,449	72.3	3,652,393	100.0	4,719,842
Minnesota	.....	.....	.....	.....	.....	.....	3,299,753	94.4	3,299,753
Mississippi	1,170,363	89.2	1,323,897	100.0	888,524	100.0	2,209,509	100.0	5,592,293
Missouri	.....	.....	.....	.....	.....	.....	3,451,438	87.2	3,451,438
Montana	.....	.....	1,235,933	79.6	1,042,164	100.0	2,580,405	100.0	4,858,502
Nebraska	.....	.....	501,153	31.6	1,064,777	100.0	2,644,726	100.0	4,210 656
Nevada	.....	.....	.....	.....	288,657	44.8	1,598,987	100.0	1,887,644
New Hampshire	.....	.....	.....	.....	.....	.....	598,242	98.2	598,242
New Jersey	.....	.....	353,092	37.7	628,355	100.0	1,565,749	100.0	2,547,196
New Mexico	.....	.....	.....	.....	443,947	55.6	1,984,363	100.0	2,428,310
New York	169,141	4.7	3,605,965	100.0	2,420,074	100.0	6,002,475	100.0	12,197,655
North Carolina	.....	.....	441,930	25.7	1,156,151	100.0	2,871,722	100.0	4,469,803
North Dakota	.....	.....	.....	.....	645,255	79.9	2,001,841	100.0	2,647,096
Ohio	.....	.....	.....	.....	.....	.....	4,547,759	99.2	4,547,759
Oklahoma	.....	.....	.....	.....	.....	.....	2,899,336	92.2	2,899,336
Oregon	.....	.....	.....	.....	.....	.....	1,941,114	97.2	1,941,114
Pennsylvania	.....	.....	.....	.....	.....	.....	5,359,238	97.1	5,359,238
Rhode Island	.....	.....	.....	.....	10,051	4.1	609,375	100.0	619,426
South Carolina	.....	.....	.....	.....	.....	.....	1,293,875	73.1	1,293,875
South Dakota	.....	.....	.....	.....	473,810	57.3	2,054,077	100.0	2,527,887
Tennessee	.....	.....	.....	.....	663,610	61.5	2,687,123	100.0	3,350,733
Texas	.....	.....	.....	.....	2,868,237	94.0	7,620,239	100.0	10,488,476
Utah	.....	.....	.....	.....	76,235	13.4	1,416,493	100.0	1,492,728
Vermont	.....	.....	.....	.....	14,901	6.1	609,375	100.0	624,276
Virginia	.....	.....	.....	.....	.....	.....	2,267,039	95.3	2,267,039
Washington	.....	.....	151,251	13.1	776,018	100.0	1,940,922	100.0	2,868,191
West Virginia	.....	.....	.....	.....	.....	.....	1,093,807	82.6	1,093,807
Wisconsin	.....	.....	.....	.....	.....	.....	2,624,034	85.3	2,624,034
Wyoming	.....	.....	.....	.....	162,853	25.7	1,568,607	100.0	1,731,460
Hawaii†	365,625	100.0	365,625	100.0	245,384	100.0	609,375	100.0	1,852,769
Totals	$2,209,987	3.0	$13,492,407	18.5	$27,112,833	55.2	$119,181,170	97.8	$162,263,158

*Includes $326,864.96 reapportioned from 1928 funds.

† There remains $266,759.63 unobligated from 1929 apportionment to Hawaii.

FIG. 1—CANBERRA, CAPITAL CITY OF AUSTRALIA
Note circle for capitol site in middle, with parliament building at right. Residential section in foreground.

Canberra, Australia's New Capital

A City in the Making

Federal Capital Begun in Open Country in 1921 Now Has 6,000 Population—City Plan Adopted Before the War—Modest Federal Buildings Put Up Instead of Monumental Ones Then Proposed—Water Supply and Sewage Disposal Provided

WHEN the several Australian states decided upon federation under the name of the Commonwealth of Australia, their new constitution, which went into effect in 1901, provided for a federal government and an independent federal city on a system comparable with the United States government and the city of Washington, D. C. It specified also that the site of the city should be a free grant within the state of New South Wales and should be not less than 100 miles from the city of Sydney. After long negotiations and much political wire-pulling as to favored sites, that state agreed, in 1909, to grant an area of 900 square miles near Canberra and also about 2 square miles at Jervis Bay for a commonwealth or federal port.

The grant took effect on Jan. 1, 1911, constituting the territory of Canberra, which contains the city of Canberra as the capital of the Australian commonwealth. Active construction did not begin until 1921. The city became officially the seat of government with the opening of parliament in May, 1927. In its relation to state capitals Canberra is 204 miles from Sydney, New South Wales; 430 miles from Melbourne, Victoria; 912 miles from Adelaide, South Australia; 930 miles from Brisbane, Queensland; and nearly 2,000 miles from Perth, West Australia. It is also about 125 miles from its port at Jervis Bay. The population of the city is about 6,000, besides 400 at Jervis Bay, while the total for the federal territory is about 8,500.

A view of the site, Fig. 1, shows how the city is beginning to appear upon the scene, its development having been interrupted by the World War. The great central circle, within which the capitol will be built, may be seen in the middle partly outlined by trees, with the new parlia-

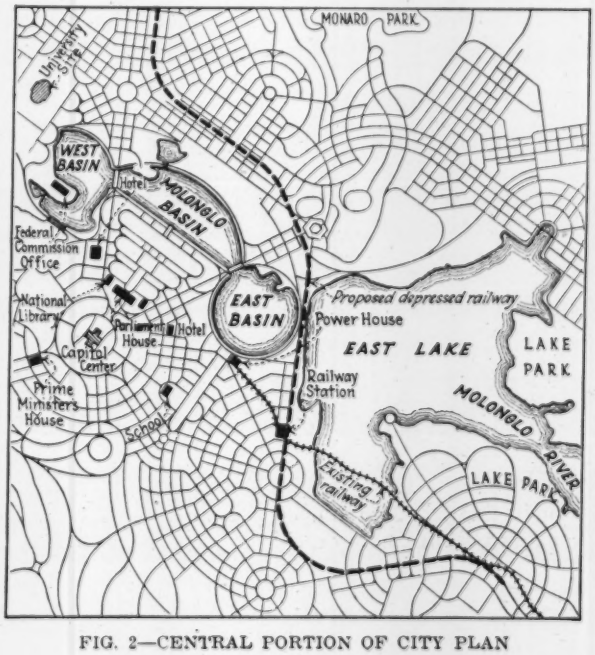


FIG. 2—CENTRAL PORTION OF CITY PLAN

ment building at its right. The geographical position of the federal territory in the Australian continent is shown in Fig. 4, which also shows its immediate surroundings and its railway connections. In Fig. 7 is shown the city area with the location of its water-supply reservoirs, sewage-works and other features.

Topography and Climate—The topography of the district is partly mountainous, while the city lies on a slightly rolling plain, as shown in Fig. 1, surrounded for the greater part by hills which shelter it from south and west winds. In elevation the city is about 1,900 ft. above sea level. Its mean annual temperature is 55 deg. F., with a summer mean of 68 deg. and a winter mean of 42 deg. The summer temperatures are high, but the nights are cool; and although winter temperatures are often below freezing, there are many mild or warm days. West winds are keen in winter as they pass over snow-clad ranges. Annual rainfall averages 25 in. for the territory and 22 in. for the city, with 40 to 60 in. on the drainage area of the Cotter River, which furnishes the city's water supply.

City Plan—Competitive designs for the layout of this capital were called for in 1911, and in 1912 the prize was awarded to Walter B. Griffin of Chicago, whose design was illustrated in *Engineering News* of July 4, 1912, p. 20. Political interests and jealousy of outsiders threatened to prevent carrying the adopted plan into effect. The Australian architects also protested against having an engineer on the board which passed upon the designs, making the modest claim that only architects were competent to judge the city planning, although this involved such engineering features as water supply, sewerage, river control, street layout, paving and local transportation service. However, in 1913 Mr. Griffin went to Australia by invitation to discuss the design with the authorities. His plan was finally adopted with some modifications which he approved, although he did not consider them desirable or an improvement upon the original. He continued in a consulting relation to the project until 1920, when his contract term expired.

The general scheme, shown diagrammatically and in part in Fig. 2, consists of a series of centers with circular and radial streets and avenues, certain districts being assigned for governmental, residential and other purposes. The Molonglo River, flowing through the site, is to be developed as a large and ornamental waterway with a terraced park sloping down from the capitol to the water. The present branch railway will be extended as a depressed line in open-cut, passing through the city,

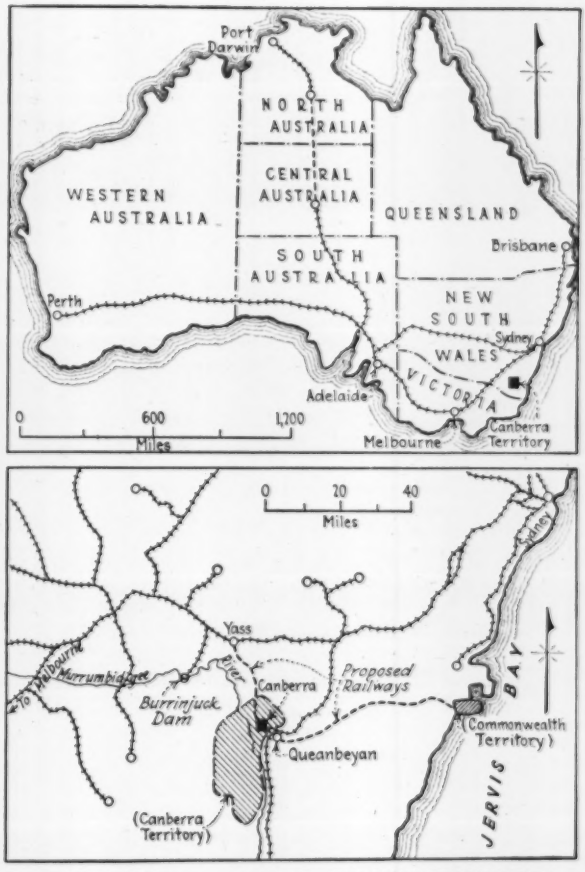


FIG. 4—AUSTRALIA AND ITS FEDERAL TERRITORY
Above: state boundaries, capital cities and transcontinental railway routes. These routes include different gages of track. The north-south railway is incomplete. Minor railways are omitted. Below: federal government territory with city, port and railway connections.

FIG. 3—TYPICAL BUILDINGS AND STREETS
Canberra Hotel in middle, city hall at right. Note main streets with central parkway.

FIG. 5—PARLIAMENT HOUSE

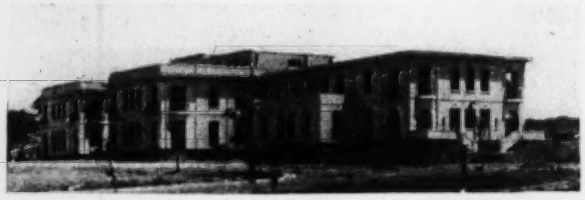


FIG. 6—GOVERNMENT POST OFFICE

with several local stations, and then continuing to connect with another of the main lines so as to put the city on a through route, as indicated in Figs. 4 and 7.

Buildings—While the original plan for this city provided for many large buildings of a monumental character, economic conditions after the World War made it necessary to defer their construction and to adopt structures of much simpler design, which will meet all requirements for several years. Foundations have been completed for the first permanent administration building, but for financial reasons the erection of the structure has been postponed.

Among the present provisional buildings are: (1) the parliament house, covering an area of 3½ acres and containing the main legislative chambers, committee rooms, library, dining room, offices and other services for government purposes, together with interior garden courts, while the surrounding gardens provide tennis courts, a bowling green and other facilities for recreation; (2) two buildings for housing various government departments, the central post office, national library and automatic telephone exchange; (3) a temporary residence for the viceroy, on a former homestead at Yarralumla, 4 miles distant; (4) a residence for the prime minister.

Completed public buildings include offices for the federal capital commission; a government printing office; the solar observatory on Mount Stromlo at El. 2,300, with its technical quarters and residences; a school of forestry, built and finished largely with Australian timbers, and an assembly building, known as Albert Hall, which serves temporarily as the city hall. Under construction are the buildings for the Australian Institute of Anatomy and the Institute of Scientific and Industrial Research. There are technical and trades schools, printing office, hospital, garage and power station. About 130 commercial buildings include schools, banks, stores, offices, a theater, eight hotels and an ice plant. Of about 920 residences, 750 have been built by the federal capital commission, and the others by private enterprise.

Street and Local Transit—The road system comprises 196 miles of highways and 79 miles of city streets. For the latter, main avenues are 200 ft. wide, with two 30-ft. roadways, 20 ft. for sidewalks and parkways and 100 ft. for a central parkway. Business streets, 100 ft. and 60 ft. wide, have 30 and 20 ft. for roadways, 20 and 12 ft. for sidewalks and 50 and 28 ft. for parkways. Paving includes: (1) macadam sealed with tar and bitumen; (2) bituminous macadam with both hot-mix and penetration

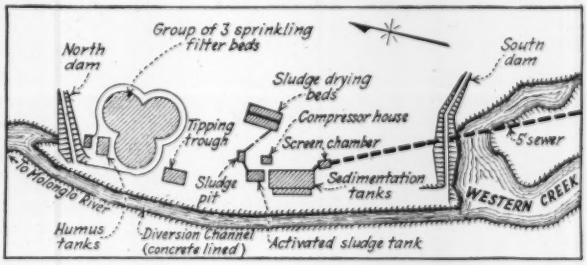


FIG. 8—PLAN OF SEWAGE-WORKS

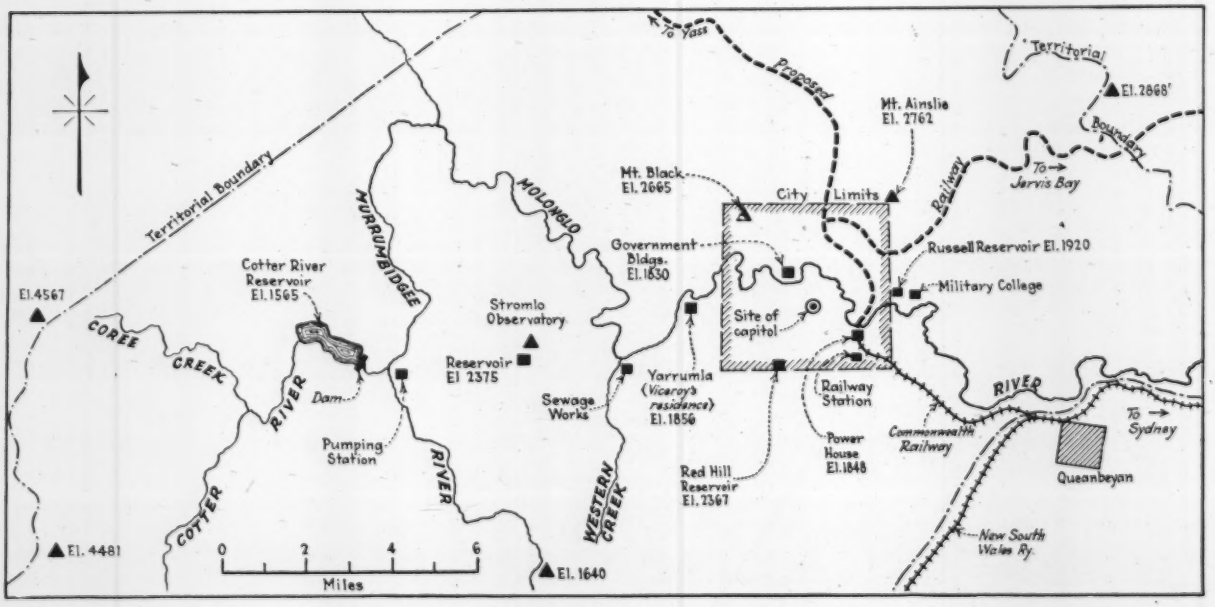


FIG. 7—CITY WATER SUPPLY AND SEWAGE-WORKS

methods; (3) concrete; (4) gravel. Sidewalks are of concrete, gravel and tar-concrete.

There are no street railways, but a city omnibus or motor-coach service is in operation and there are about 1,200 automobiles in use. About 200 acres of parks and public spaces have been planted with trees and shrubbery. The general street treatment and the types of buildings are indicated in Fig. 3.

Water Supply—A 60-ft. concrete dam on the Cotter River forms a storage reservoir of 380 m.g., with provision for increase to 100 ft. in height and 1,400-m.g. capacity. An 18-in. main 4,100 ft. long, in tunnel under the Murrumbidgee River, runs from this reservoir to a pumping station and delivers to a 3-m.g. service reservoir on Mount Stromlo, with gravity supply to two other reservoirs (see *Engineering News-Record*, Sept. 8, 1927, p. 386). Electrically operated centrifugal pumps on the 18-in. force main to Mount Stromlo, 3½ miles, operate against a head of 840 ft. There are about 45 miles of force and gravity mains, with 78 miles of city distribution mains.

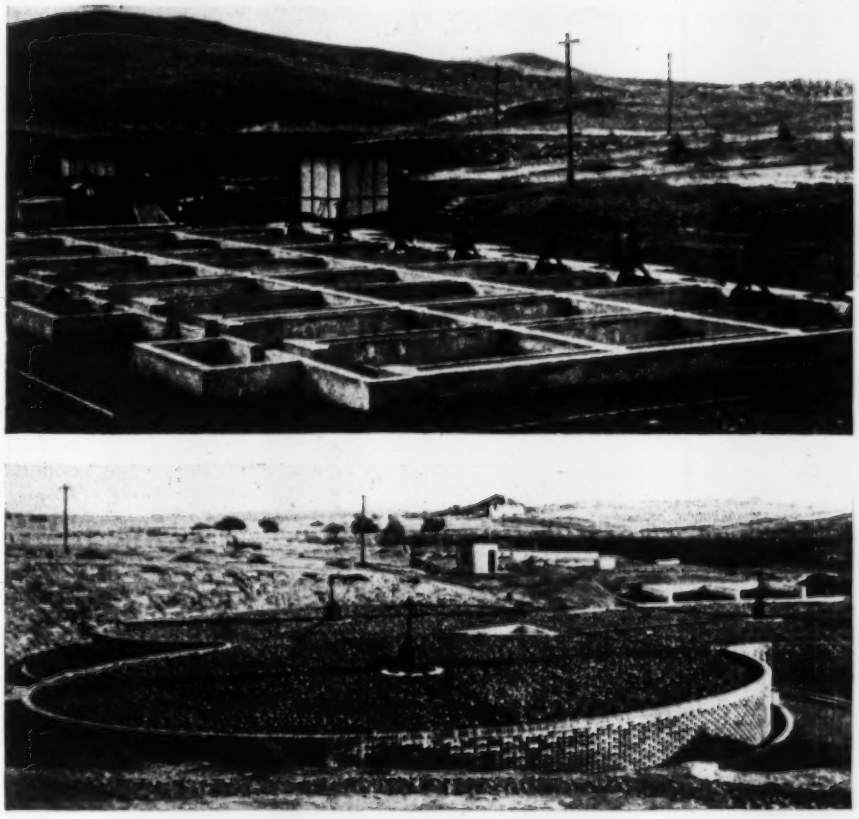


FIG. 9—SEWAGE-WORKS AT CANBERRA
Above, sprinkling filters; below, sedimentation tanks.

Sewerage and Garbage Service—The sewerage system comprises a main intercepting sewer and collecting sewers in the principal valleys, with sewage-works at Western Creek, 4 miles from the city (see Fig. 7). There are now in service 10 miles of main sewers with 45 miles of branches. The sewage-works include sedimentation tanks, activated-sludge tanks, sludge drying-beds and sprinkling filters with effluent discharge into the Molonglo River.

Domestic garbage and refuse is collected by contract. A modern type of hog farm has been established and is leased under an agreement by which the lessee undertakes the collection of wet garbage and kitchen from the hotels. Street refuse is collected by the commission's forces and is burned at a dump outside the residential area.

Electricity and Gas Supply—Arrangements have been made with the government of New South Wales to supply electrical energy from its hydro-electric plant at the Burrinjuck Reservoir. An 80-mile 66,000-volt transmission line has been built from this plant to the city power station, where the current is transformed to 5,500 volts. This service was put in operation in September, 1929, up to which time current was supplied from the 3,000-kw. steam plant at the power house, which is now used as an emergency station. A gas plant is projected.

Construction Materials—All work is done under the direction of the federal capital commission, and as the city is at a considerable distance from any source of supply of construction materials, the commission has established a large brick-making plant and a plant for making concrete pipe, fence posts and other precast-concrete products. A quarry is equipped with crushing and screening plant to produce broken stone for roads and concrete work. Wood-working and machine shops are also provided for repair and construction work in the territory.

Local Government—In the earlier stages of development the Canberra Territory was under the control of the several departments of the federal government, with an advisory committee, appointed in 1921, to assist in getting the city completed for the meeting of the new federal government. To expedite construction as well as to develop municipal and territorial services and general administration, the advisory committee was replaced in 1925 by the present federal capital commission, one member of which represents the citizens of Canberra.

The activities of this commission include: general administration, construction of public works and buildings, roads and bridges, water supply, sewerage, power service, public health, education, levying of taxes, housing, local government and other registration, traffic control, transport and city omnibus service, hotels and boarding houses, land administration and regulation of stores, shops and factories. Also such allied subjects as stock and meat control, dairy supervision, agriculture, forestry and the construction and maintenance of parks and recreation grounds.

For economic reasons, no large construction program is contemplated for the near future. It is proposed to revert to a system of departmental control of administration, allied to an advisory council upon which residents will have considerable representation. The police force of the territory is under control of the attorney-general's department. There is no city engineer, but W. E. Potts is chief engineer of the federal capital commission.

Toll Bridges in Operation Total 296

By P. K. Schuyler
President, Federal Bridge Co., New York, N. Y.

THE NUMBER of highway toll bridges in operation in the United States has been increasing during recent years. On Oct. 1, 1927, there were 233; on July 1, 1929, 272; on Dec. 1, 1929, 287; and on Aug. 1, 1930, there were 296. Also at the present time there are 51 toll bridges under construction in various sections of the country.

In the eighteenth and the first part of the nineteenth centuries, prior to the development of adequate highway transportation, highway toll bridges were prevalent. It was customary for local interests to construct these bridges where required and to charge a small toll for passage. During the latter part of the nineteenth century, however, public funds began to be used to a considerable degree for highway construction, and a great many of these earlier toll bridges were taken over and replaced by free structures. At the beginning of the twentieth century motor vehicles came into general use and created extensive demands for adequate highway facilities. Since that time the construction of free bridges with public funds has proceeded rapidly. There were, however, conditions where large bodies of water existed, and sufficient public funds were not available for the construction of a free bridge, and it is at these locations that toll bridges have been built and would appear to be justified.

On the accompanying map can be seen the location of the 296 toll bridges in operation on Aug. 1, 1930, of which number 96 or 31 per cent were publicly owned. The trend of late years seems to have been toward public ownership, and at the present time in Alabama, Arkansas, California, Kentucky, Louisiana, North Carolina, New York, Tennessee, South Carolina, Washington and West Virginia this trend is most marked. Bonds are issued by the state or by some state agency, and these bonds are secured by the revenue to be derived from the property. The bridge is then built and operated under public supervision until such a time as the bonds have been laid off, when the structure becomes free to the public.

Privately owned toll bridges have been constructed in recent years from the proceeds of the sale of securities to the public. Some of these private projects are rendering a satisfactory and economical service to the traveling public, whereas there are other examples of over-capitalization and excessive charges.

Toll bridges in a number of states are classed as a public utility and are under the control of the public service commissions. In Pennsylvania, where seventeen toll bridges are located wholly within the state and eight on the boundary lines, the intra-state bridges are, according to Pennsylvania law, subject to the jurisdiction of the public service commission to the same extent as telephone, water and power companies are. This commission has the authority to regulate rates and service and has exercised this power in several instances. Along with the regulatory power, however, the toll bridge company derives benefits from commission control, such as the protection against unwarranted competition, and so long as existing bridges are adequate to serve the needs of traffic, authority for the construction of a competing structure will not be granted.

There is at the present time invested or contemplated for investment in toll bridges, including both public and private projects, an estimated amount of $1,100,000,000. It may thus be realized that toll bridges constitute an important field. Both state and federal legislative bodies at the present time have under contemplation legislation affecting the regulation and construction of new bridges, and this legislation should be given detailed study, so as to thoroughly protect the traveling public and assure the construction of only such bridges as are warranted, and further, that when constructed the bridges will be operated under adequate regulation.

TOLL BRIDGES OPERATING IN U.S.A. ON AUGUST 1, 1930

Building for Industrial Engineering Research

Hollow Columns and Girders Inclose Air Ducts and Piping in New A. O. Smith Laboratory, Which Has Welded Steel-Plate Floors and Mechanical Ventilation—Large Bay Windows Form Wall Area, With Aluminum Pilasters and Spandrels

HOLLOW columns and floor girders designed to accommodate all pipes and wire services, which are thus concealed but are readily accessible for inspection, alteration or repair, constitute a strikingly novel structural feature in the new steel-frame building for the engineering and research department of the A. O. Smith Corp. plant at Milwaukee, Wis. Unobstructed floor areas, walls composed largely of glass, easy connection to any utility service at any part of a floor, and provision for future alterations and interior rearrangement of rooms or laboratories to suit changing requirements are other important features. The glass frontage is also an architectural feature, arranged as a triangular bay window in each panel. For the vertical spaces between the windows and for the shallow spandrels the exterior finish is of aluminum, the only masonry being buff stone for the corners and a base course of black stone.

Purpose of Building—In its manufacture of stamped, welded and riveted steel products (notably automobile frames and welded pipe) the company's policy is to use machinery in every possible way and to reduce the labor element to a minimum. As standard machines and tools do not meet the numerous special requirements, the company's technical staff is continually designing and building new machines, which to a large extent operate automatically, while mechanical conveyors handle the work between the various machines. For this machine-design work, as well as for studies and investigations in connection with oil-refinery apparatus, the company has a staff of about 1,000 engineers and chemists. Research work of this kind is assisted greatly by convenient quarters and facilities, and it is to meet these conditions as well as to concentrate the staff that the new building has been erected.

Taken altogether, this engineering and research building is a notable structure. Its design was not simply a matter of providing adequate floor-space. Of more importance was the provision of a maximum of convenience and service, together with provision for future alterations to suit developments in laboratory equipment or methods.

General Description—In plan the building is U-shaped, seven stories high, besides basement and attic, as shown by Figs. 2 and 3. Its frontage is 170 ft., and it has a depth of 205 ft. The wings are 45 ft. wide, leaving a court 80 ft. wide between them. This court, to be used for testing equipment and heavy machinery required in mechanical and electrical research work, is equipped with a 20-ton overhead traveling crane, and at about the third-floor level it is covered by an arched roof made up of pairs of trusses riveted to the wall columns.

Throughout the building the columns are arranged in the walls and carry floor trusses which span the entire width. With this arrangement there are no interior columns, and the floor area can be divided as desired by tile partitions, which can be removed or rearranged to suit changes and requirements. The longitudinal spacing of columns is 20 ft. c. to c., except for 25-ft. bays at the corners of the front. In the main stories the height is 14 ft. from floor to floor. The roof is of cement tile, while the court or craneway is roofed with a concrete and wire-glass skylight. Exposed parts of the trusses are covered with metal lath and cement plaster.

Structural Design—The riveted columns, Fig. 4, approximately 3 ft. square, are composed of four interior corner angles 6x6 in., 9/16-in. plates for the sides (except for a panel of lacing bars in each story), batten plates and two exterior angles 4x6 in. on the inside face, and both plates and lacing bars on the outside face.

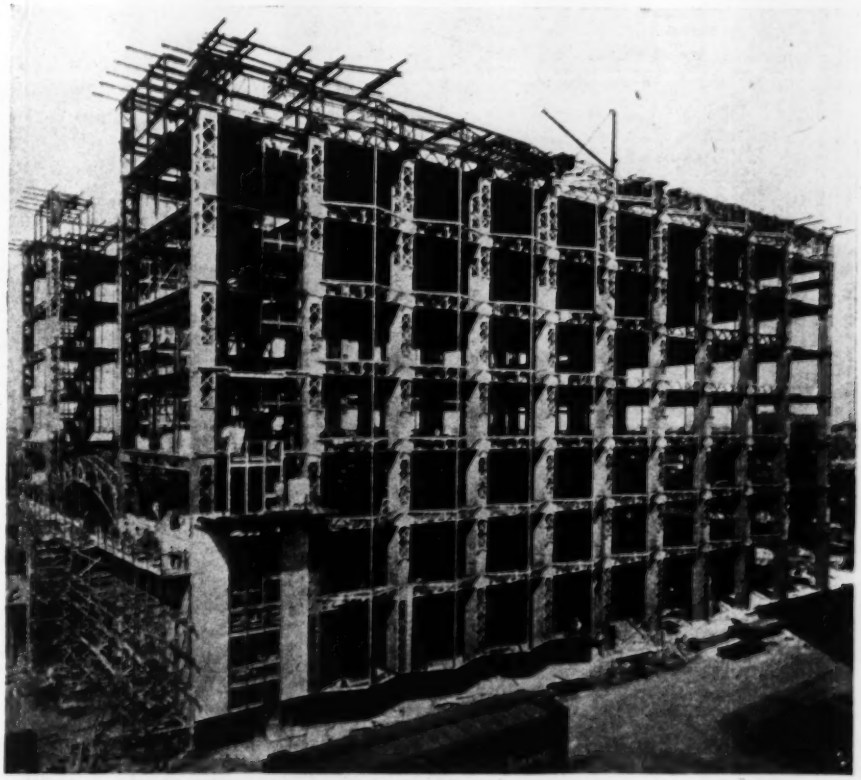


FIG. 1—ENGINEERING AND RESEARCH BUILDING, A. O. SMITH CORP.
View shows side and rear, with arched trusses for roof over craneway in court. Spandrel trusses are above the floors, so that the ceilings of the triangular window bays extend to the level of the floor above. Aluminum and glass form the side walls with masonry only at the corners and in the temporary end wall.

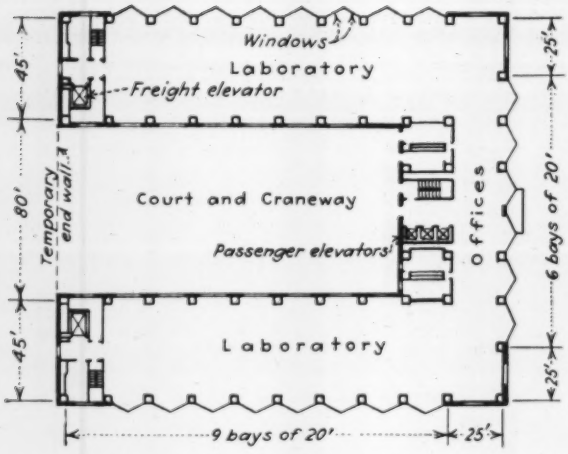


FIG. 2—GENERAL PLAN OF BUILDING

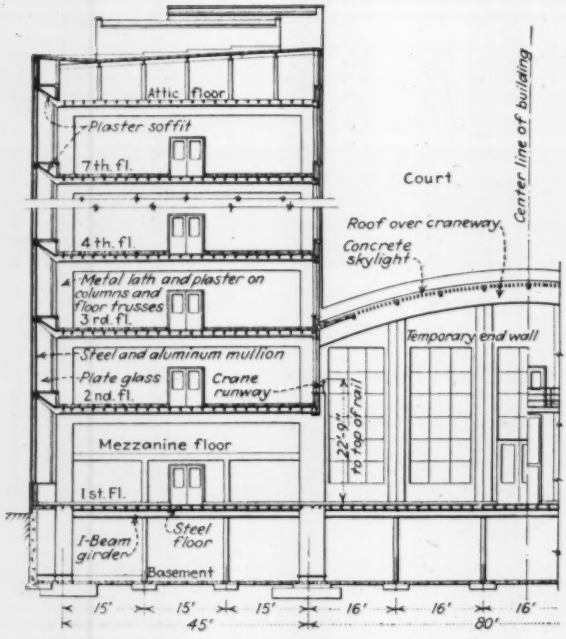


FIG. 3—TYPICAL CROSS-SECTION

Horizontal stiffener angles on the outside face serve also as shelf angles for the attachment of the exterior architectural facing. The column is wrapped with expanded metal lath and covered with 2 in. of cement plaster, which is given a surface finish of paint. An opening or manhole is provided in the basement section of each column for access to the interior, which is fitted with ladder irons to enable repair men to reach any part of the pipes and wires inclosed in the column. Manholes are provided also in the attic.

Framed against the sides of the column are two trusses approximately 30 in. deep and 3 ft. apart, as shown in Figs. 4 and 5. Each chord is composed of two 5x4-in. angles, but those of the top chord have the 5-in. legs upstanding, so that the horizontal legs form seats for the 5-in. I-beams of the "battle deck" floor framing, whose upper flanges are thus flush with the tops of the trusses. These beams tie the trusses together at the top, while transverse 6-in. channels resting on the bottom chord flanges tie the two trusses together. The box girder thus formed has a covering of expanded metal and $1\frac{1}{2}$ in. of plaster. This covering (but with 1 in. of plaster) is extended to form the ceiling, which is painted like the columns.

Manholes about 23x18 in. have steel frames welded in place and fitted with $\frac{1}{8}$-in. steel doors giving access to the interior of the columns through the metal-lath and plaster bulkheads or firestops, which isolate the hollow girders from the columns. Pipes and wiring are carried through sleeves in the bulkheads. From the sides of girders the pipes and wires are extended laterally in the space between the ceiling and floor to any desired position. Pipes 12 ft. long can be passed into the columns from the basement, while pipes 7 ft. long can be passed into the girders from the columns and into the floor spaces from the girders.

Floor and Roof Construction—Floor construction consists of 5-in. I-beams spaced 2 ft. c. to c., resting on the floor trusses and carrying 3/16-in. deck plates 6x20 ft., which are electrically spot-welded to the I-beams through 2-in. slots. This welding operation is shown in Fig. 6. For the floor surface a specially designed concrete is used, 1 in. thick, reinforced by steel plates which are stamped to form a series of 2-in. rings 1 in. deep. This reinforcement is tack-welded to the deck plates, and the steel rings, being flush with the surface, will take the wear. After the concrete has set, it will be finished with a grinding machine. For the offices the floor finish will be 13/16-in. wood blocks $11\frac{1}{2}$ in. square, attached to the

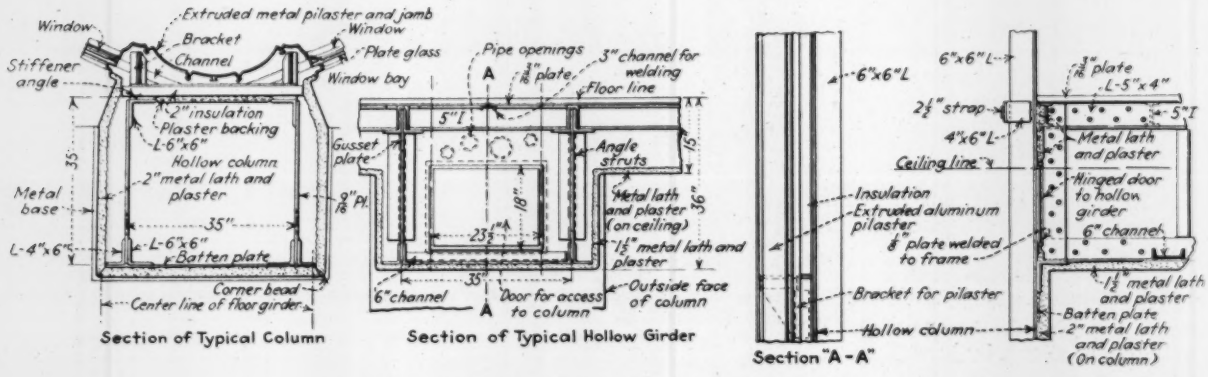


FIG. 4—HOLLOW COLUMNS AND FLOOR TRUSSES

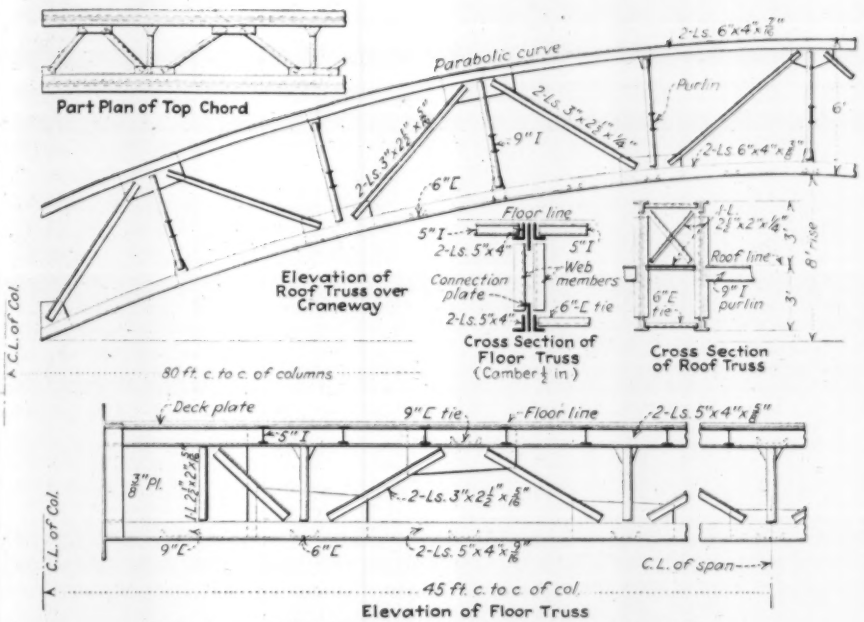


FIG. 5—TRUSSES FOR FLOORS AND CRANEWAY ROOF

steel deck plates by a mastic coat. The roof of the building is of cement tile on I-beam framing.

Over the court and craneway a roof is carried by arch ribs composed of curved steel trusses in pairs (see Figs. 3 and 5). These trusses are riveted against the sides of the columns in the same way as the floor trusses in the building and at a level below the floor trusses of the third floor. The two trusses of each rib are connected by ties and diagonal bracing between the top chords and by 6-in. channel ties on the bottom chords. Purlins of 9-in. I-beams spaced 8 ft. apart and welded to the truss posts carry a concrete and glass skylight roof. The upper part of the trusses, extending above this roof, will be inclosed with metal lath and cement plaster and covered with aluminum flashing. The portion of the trusses below the roofing, as well as the purlins, will be inclosed in metal lath and plaster.

Windows and Walls—Window design of the exterior walls is unusual in that the glazed area forms the greater part of the inclosing surface, with stone corners and base, as described. None of the windows, either in the outside walls or the court walls, can be opened, as the building will be ventilated mechanically and the air conditioned as required, cool air being furnished in summer and warm air in winter. In the exterior walls the window of each 20-ft. structural panel is a convex triangular bay of the full width between wall columns. A typical window extends from 2 ft. 7 in. above the floor to practically the same level above the next floor, the spandrel being above the floor, so that the top or soffit of the bay window slopes upward in triangular form from the ceiling of the room. This soffit is of plaster on metal lath and incloses the structural spandrel truss.

Each side of the bay is formed by a fixed sash having a single sheet of ¼-in. plate glass secured in place by removable exterior stops of extruded aluminum attached to the sash. The sash and frames are of the same material, with the frames welded by means of aluminum straps to the angles on the hollow columns. Extruded aluminum

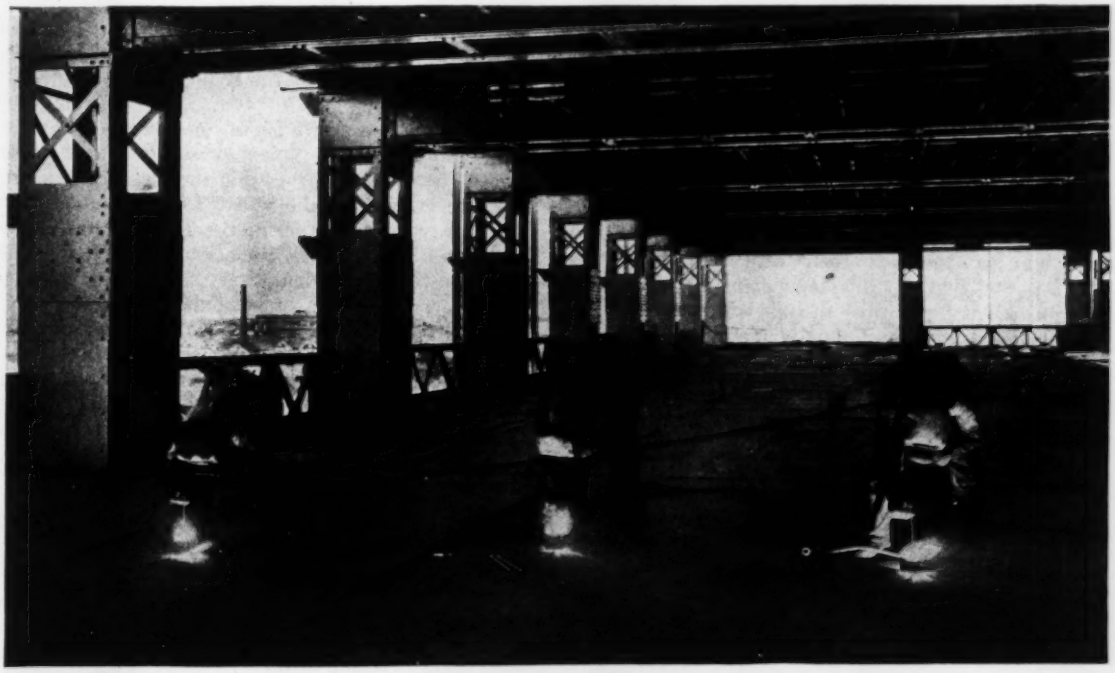


FIG. 6—WELDING THE STEEL FLOOR

Note the large hollow columns with pairs of floor trusses riveted to them. Spandrel trusses above floor permit lofty windows.

ir vertically fluted forms incases the exterior surfaces of the columns (see Fig. 4), and these also are field-welded to shelf angles and brackets on the columns by means of aluminum straps. Slip joints for expansion of this aluminum facing are provided at each floor level, or 14 ft. apart. Extruded aluminum sections 9 in. high form the typical exposed spandrels, while the cornices over the triangular window bays are of sheet aluminum.

In the walls fronting on the court special steel sash with plate glass forms the larger part of the area, with brick below and between the window frames. Similar brick and steel sash construction is used also to close the ends of the wings and craneway, in order to provide for easy removal when the building is extended.

Utility Service—Utilities arranged within the hollow columns and girders to provide for physical and chemical laboratory operations and experimental work include wiring for light, power and telephone services, high-tension cables for electric welding and pipes for water, steam, gas, fuel oil, oxygen and compressed air. Sprinkler pipes also are placed, only the heads being exposed. Furthermore, the columns will form ventilating ducts, by which fresh warm or cool air will be discharged into the rooms and foul air withdrawn. Although the pipes reduce the efficiency of air distribution, the advan tages of placing them in the columns were considered t more than balance any objections to this arrangement.

A special feature is that the several utilities can be car ried close to any designated point on the floor withou interfering with the occupants of the rooms or tearin up the flooring. The only work to be done within th room will be the cutting of a floor opening in the stee deck to bring in the desired pipe or cable already place in the space between the floor and ceiling.

Engineers—This research building was designed b E. W. Burgess, construction engineer for the A. O Smith Corp., who also planned the unusual construction which enables all utility services to be concealed but still easily accessible for inspection and alterations. The architects are Holabird & Root, Chicago. Separate contracts were placed for the different branches of the work, and the construction was done under the supervision of the engineering department of the A. O. Smith Corp. In the erection of the steel frame by the Wisconsin Bridge & Iron Co., a 60-ft. movable tower, or traveler, was used, having two derricks with 115-ft. booms mounted at diagonally opposite corners. Work began in June, 1930, and is to be completed by Jan. 1, 1931.

Modified Types of Gravity Dams in Relation to Uplift

Some Factors to Be Considered in Studying Dam Design in the Light of the Increased Importance Now Attached to Uplift

By Fred A. Noetzli
Consulting Engineer, Los Angeles, Calif.

THE CHARACTERISTICS of some modified types of gravity dams believed to possess elements promoting both safety and economy, as compared with the usual current practice, are outlined in the following. Many of the features of design illustrated already have been used in practice, some have been described only in publications not readily available, and in a few instances the drawings include the writer's own suggestions. Every dam site presents a problem peculiar to itself, and because many factors affect the safety of dams it is hoped that the following data put together in concise form will be helpful in analyzing problems of design, so as to secure maximum safety for a given set of conditions.

A typical gravity dam section has a factor of safety of little over unity. Nevertheless, past experience has shown that with relatively few exceptions these dams have been able to withstand successfully the loads to which they were subjected. No gravity dam designed for a reasonable amount of uplift and built on an adequate foundation has ever failed. A few dams designed without allowance for uplift have been destroyed. In most if not all of these latter cases, uplift pressure was found to be one of the major causes of the failures. There seems to be no escape from the conclusion that if a uniform-section gravity dam is to be safe it must be designed for a reasonable amount of uplift, unless positive and unfailing means are available to prevent a dangerous amount of water pressure underneath or inside the dam. Such means, of course, must continue to function perfectly during the life of the structure if its safety is not to decrease.

There has been much discussion recently regarding the proper allowance for uplift pressure in the design of dams. The writer believes that the elimination of a considerable portion of the uplift force as effected in the modified types described in the following is preferable even to an accurate determination of uplift in the ordinary type of gravity dam.

In Figs. 1 to 10 is illustrated what appears to be a logical, progressive development of the gravity-type dam from the enormous masonry cross-section used by ancient Chaldean, Egyptian and Roman engineers ("Some Dams of the Ancients," by Charles Prelini, *Engineering News-Record*, Oct. 6, 1921, p. 556) to the modern thin reinforced-concrete dams of the Ambursen and multiple-arch types, sometimes referred to as "hollow" gravity dams. Particular attention is directed to some intermediate types of mass-concrete gravity dams in which uplift pressure is greatly reduced by large drain spaces located between the individual vertical portions of such dams. This partial elimination of uplift in these modified types not only decreases one of the greatest sources of danger in the ordinary gravity dam but fortunately also decreases the cost.

Fig. 1 shows a typical profile of a masonry dam as de-

signed and built some 3,000 to 4,000 years ago. The thickness of the dam at the base is three to four times its height. Fig. 2 is the cross-section of a typical uniform-section gravity dam of recent design. Its thickness at the base is 0.73 times the height, allowing for uplift of 50 per cent at the upstream face, diminishing to zero at the downstream face.

Fig. 3 is a horizontal cross-section through an ordinary straight gravity dam. Vertical construction joints spaced 50 ft. apart divide the dam into vertical portions, which are poured one against the other. Shrinkage of the concrete usually opens the joints by a slight amount, but leakage is prevented by water seals placed across the joints near the upstream face of the dam. There may be corrugations or keyways in the joints between adjacent sections, although some engineers favor smooth joints, allowing the water that may pass through or around the water seal a free getaway, and thus preventing the possibility of undesirable pressure building up in the interior of the section. A smooth joint also will permit a slight movement between adjoining portions of the dam, for instance, during an earthquake, without danger that one portion may put upon the adjoining portion additional load for which it is not designed, and thus introduce risk of rupture.

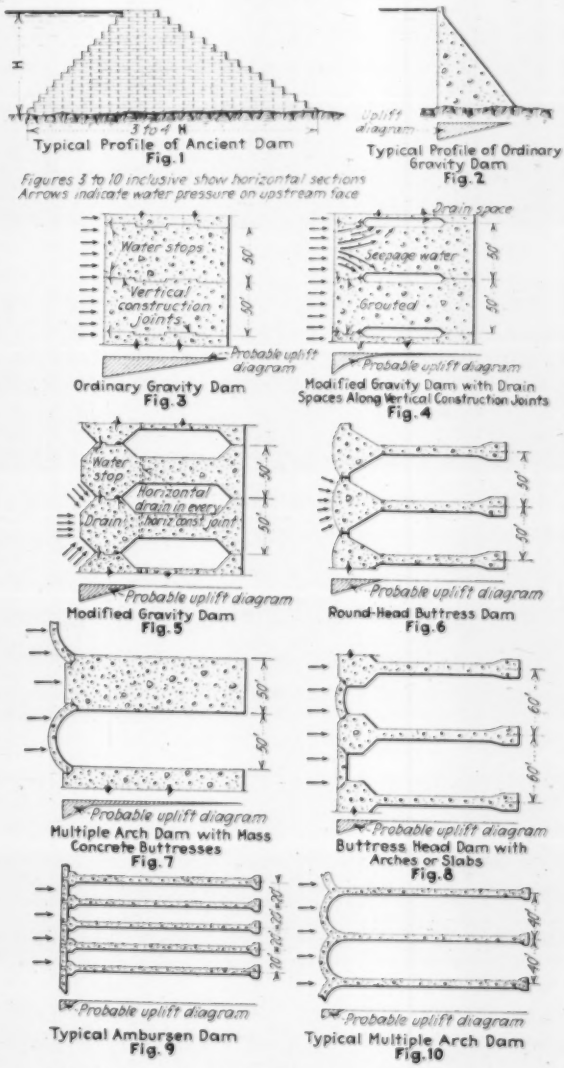
Fig. 4 shows a horizontal section through a modified type of gravity dam, which differs from the ordinary type in that open spaces are left along the contraction joints in the interior of the section. These open spaces serve several purposes: (1) They provide positive, unfailing and accessible drainage and therefore will tend to diminish largely, if not eliminate entirely, the uplift pressure in the dam and under its base; (2) they will decrease the rise of temperature in the dam after pouring of the concrete and will allow a more uniform cooling, thus tending to diminish the stresses which exist in large concrete dams due to the considerable difference of temperature of the mass in the interior and near the face; (3) they permit of the saving of a considerable amount of concrete without decreasing the safety of the structure if it is otherwise properly designed, because in the interior of a gravity section the load stresses are always relatively small, and the omission of some of the concrete in this part of the structure is entirely feasible.

The watertightness of the joints between adjoining sections of the dam, shown in Fig. 4, can be secured by water seals near the upstream face, as in an ordinary gravity dam.

In a dam of great height such as, for instance, the proposed Boulder Canyon Dam, and for relatively low permissible foundation stresses, the weight of the structure itself may necessitate a considerable increase of the thickness of the section. A modified type with decreased weight, as shown in Fig. 4, would therefore appear to be quite suitable for such conditions. A combination of gravity and arch action would be feasible also with this type by making the solid upstream portion about 75 to 100 ft. thick and grouting the joints, as indicated in Fig. 4.

Fig. 5 shows a horizontal section through a dam in which for additional economy the width of the open spaces along the joints has been increased. In order to prevent lateral bending moments in the upstream parts of the section, the face is shaped in such a manner that the water pressure is transmitted to the supporting wall by direct compression.

In Fig. 6 is shown the roundhead buttress type in which, it is believed, the maximum economy is effected in a gravity-type dam of mass-concrete construction. A dam of this type was built in 1928-29 for a Mexican government irrigation project on the Rio Salado, Mexico, about 60 miles west of Laredo, Texas. (See *Engineering News-Record*, March 21, 1929, and *Western Construction News*, Jan. 25, 1930.) This design has been patented by the writer. (The patent was offered to the Engineering Foundation, but that organization decided that it could not accept patent gifts. The patent rights have since been taken over by the Ambursen Dam Co., New York.)



DAM SECTIONS SHOWING PROGRESSIVE CHANGES IN DESIGN

Fig. 7 illustrates a dam in which alternate portions of a uniform-section gravity dam are omitted and arches substituted therefor. Such a structure may be considered a multiple-arch dam with mass-concrete buttresses. The shape of these buttresses must conform to the loads, of course. The Venina Dam, built in 1925-26 in the Alps by the Italian engineer Pietro Bonetti, is of this type. (See Wegmann, "The Design and Construction of Dams," eighth edition, 1927, p. 513.)

Fig. 8 illustrates a further modification in type, namely, a combination of relatively heavy buttress walls

with relatively small buttress heads, the space between adjoining units being bridged by arches or slabs. This type is especially well adapted to a wide spacing of the buttresses, say from 60 to 100 ft.

Finally, Figs. 9 and 10 show the well-known types of Ambursen and multiple-arch dams. In the same class are also dams in which the deck is supported by inclined columns instead of buttresses.

To summarize, Figs. 1 to 10 show dams with a progressive increase in economy of material. The amount of uplift to which these dams may be subjected grows smaller progressively, as indicated by the typical diagrams of uplift pressure shown for each type. In order to keep the sliding factor within safe limits the upstream face of the lighter types must be built on a slope, so that the water overlying the face supplies the additional weight required against sliding.

Both the uniform section and the thin reinforced-concrete types have been used extensively in the past. It is believed that some of the intermediate types, especially those of mass construction, deserve equal consideration and may in many cases offer advantages over either an ordinary gravity dam or a thin-section type.

Large Activated-Sludge Plant for San Antonio, Tex.

Effluent May Be Used for Irrigation as Sewage Has Been for 30 Years—Sludge Digested and Gas Utilized

By H. R. F. Helland

Associate Engineer, Hawley & Freese, Consulting Engineers, San Antonio, Tex.

DISPOSAL of the sewage of San Antonio, Tex., by irrigation is to give way to the activated-sludge process, with expected continued utilization of the sewage on land after treatment. The new plant, which is scheduled for completion in April, will have a rated capacity of 30,000,000 gal. a day (30 m.g.d.), which is exceeded by only a few activated-sludge plants in the world. Elements of the plant are a Venturi meter, a revolving screen, an incinerator for screenings, grit chambers, presettling tanks, activation channels of the spiral-flow type, final settling tanks, heated separate sludge-digestion tanks, sludge lagoons, various sludge pumps and a laboratory.

Since 1901 the sewage of San Antonio has been stored in a 900-acre reservoir, called Mitchell's Lake, for use in the irrigation of about 4,000 acres of land. Recently the flow has exceeded the capacity of the land, and at times complaints of nuisance in the San Antonio and Medina rivers have been made. In 1928 the city engaged engineers to make plans for sewage treatment. Gagings for ten months showed an average sewage flow of 16.4 and a maximum of 24.8 m.g.d., the latter with sewage spilling over the channel. On the assumption that 220,000 of the 285,000 estimated population were connected with the sewers, the per capita flow was 75 gal. The 30-m.g.d. plant under construction is assumed to suffice for a future population of 400,000.

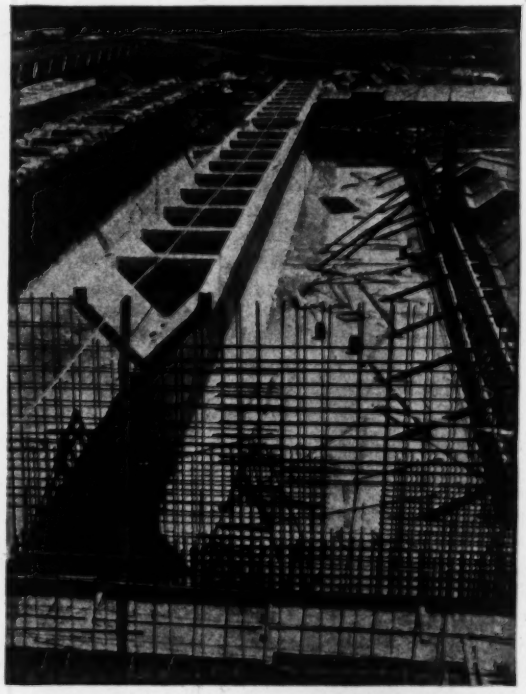
Abstract of paper read at Texas Water-Works Short School, January, 1930.

The new works are located about 6 miles south of the city, in a valley, across which the sewage was conveyed in a flume in the line of the old earth channel to the storage lake. This location makes pumping unnecessary, except of sludge. Only 1 ft. of head will be lost by the sewage in passing through the plant, to which the sewage will be brought by 3,000 ft. of concrete sewer.

The revolving screen already mentioned has ½-in. openings between its bars and is placed in one of the two screening channels, the other being provided with a bar screen having the same size of clear openings. The grit chamber is in three channels, any two of which can pass the sewage at the designed velocity of 1 ft. per second.

Before the screened sewage reaches the presettling tanks it passes through channels equipped with aerators to prevent deposits. Each tank is 60x60 ft. in plan, with an average water depth of 11 ft. The tanks are designed for a 30-minute detention period, with an expected removal of 42 per cent of suspended solids. The flow is across the tanks through adjustable inlet weirs and submerged outlets. The tanks are equipped with oil and grease skimmers, scum drains and revolving sludge scrapers.

Presettled sewage and 20 per cent of return sludge are mixed by upward moving air in a channel 200 ft. long. The activation channels are in six batteries of three each, giving a combined flow length per battery length of about 450 ft. Each channel is 20 ft. wide, with a sewage depth of 15 ft., has three rows of diffuser plates on one side and top and bottom "baffles" (corners filled; see view) to give spiral flow to the air and sewage. The ratio of plate and tank area is 1 to 7. Re-aeration of return sludge is effected in the center channel, but either

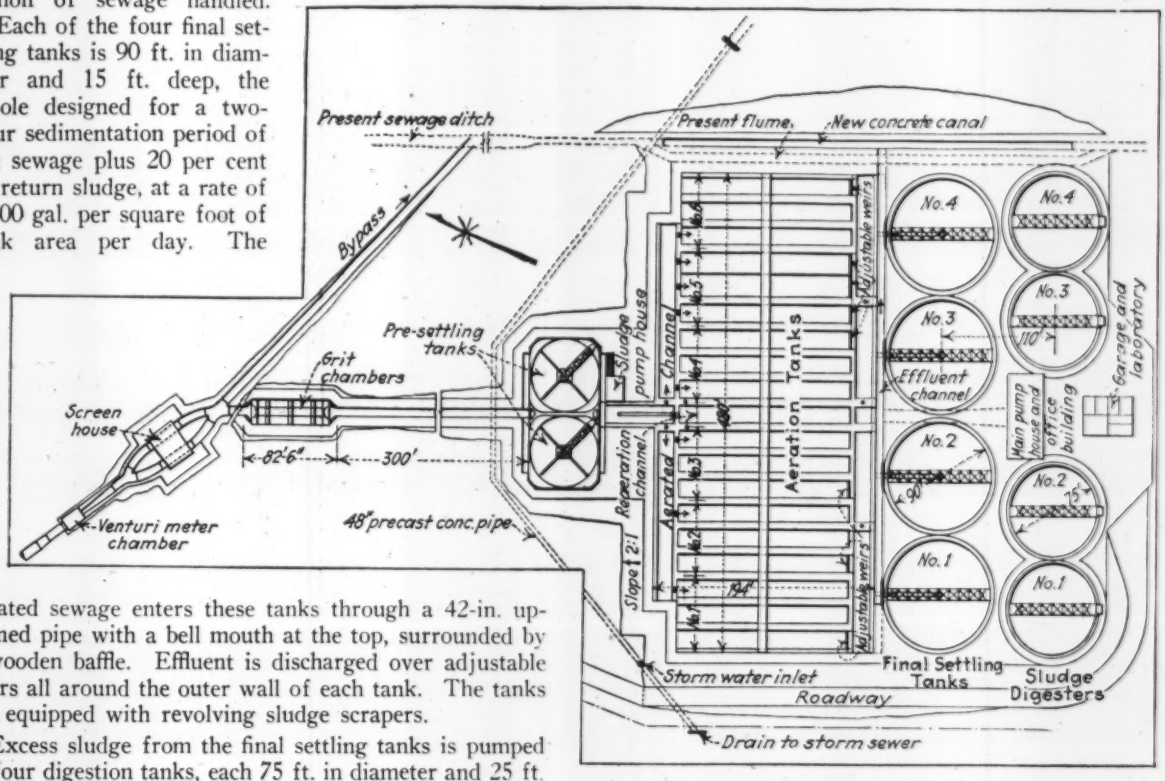


ACTIVATION TANKS UNDER CONSTRUCTION

Channel division wall in center of view is shaped at top and bottom to aid spiral flow caused by placing the plates for air diffusion at side of channel. There are six tanks, each with three channels connected around end to give sewage longitudinal travel of 450 ft. in addition to the spiral motion.

one, four or seven channels can be used for the purpose. The plant is designed for a five-hour aeration period at the rate of 1½ cu.ft. of air under 8 lb. of pressure per gallon of sewage handled.

Each of the four final settling tanks is 90 ft. in diameter and 15 ft. deep, the whole designed for a two-hour sedimentation period of the sewage plus 20 per cent of return sludge, at a rate of 1,600 gal. per square foot of tank area per day. The aerated sewage enters these tanks through a 42-in. upturned pipe with a bell mouth at the top, surrounded by a wooden baffle. Effluent is discharged over adjustable weirs all around the outer wall of each tank. The tanks are equipped with revolving sludge scrapers.



LAYOUT OF ACTIVATED SLUDGE PLANT UNDER CONSTRUCTION FOR SAN ANTONIO, TEX.

Sewage is metered, screened, cleared of grit and presettled before being subjected to activation by spiral air flow and to final settlement. Sludge is digested in covered tanks and sent to large lagoons. Gas from digestion tanks burns screenings and heats water to provide optimum temperature in digestion tanks.

Excess sludge from the final settling tanks is pumped to four digestion tanks, each 75 ft. in diameter and 25 ft. deep, equipped with scum breakers and sludge scrapers. The tanks have concrete roofs, supported by I-beams suspended from a supporting truss. Gas-collection domes and supernatant-liquid overflows are provided. The four tanks give 45 days' storage. An optimum temperature for sludge digestion will be maintained by hot water coils placed around the inside wall of each tank. Gases of digestion will be used to heat water for the coils and to burn the screenings at the inlet to the plant. Digested sludge will be pumped to two sludge lagoons, each about an acre in area and 10 ft. deep.

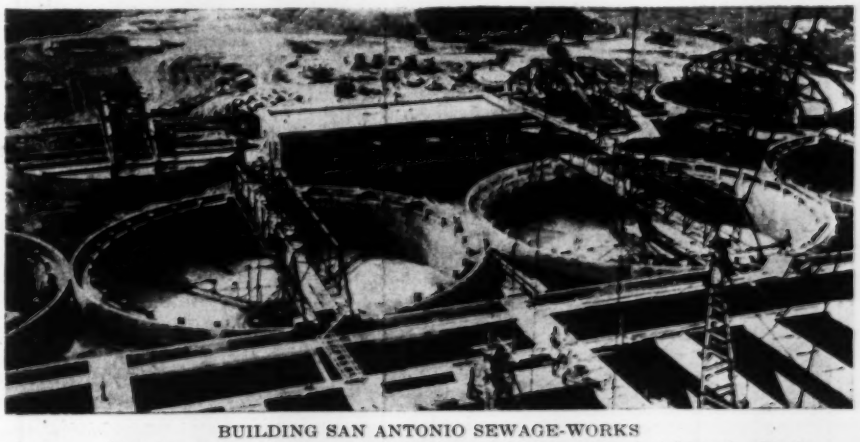
Venturi meters will be used to measure not only the incoming raw sewage but also the air supply, return sludge, excess sludge and air for the blowers. Gas from the digestion tanks and gas supplied to the screenings incinerator and to the hot water heater will be metered.

Final effluent will flow through the existing earth channel to Lake Mitchell and from the lake either to the rivers already mentioned or to irrigation ditches. An irrigation district may be formed.

The favorable location of the plant in a valley near the old sewage outfall ditch, the levelness of the site and the compactness of plant (425x500 ft., or less than five acres for 30-m.g.d. capacity), combine to give the low estimated cost of $900,000, or $30,000 per 1 m.g.d. The construction contract was let on April 1, 1929, to J. De Puy, San Antonio. The revolving screen, the revolving sludge scrapers and skimming devices for the presetting tanks and the scum breakers for the digestion tanks are being supplied by the Dorr Co., New York City. The sludge scrapers for use in the four circular tanks used for final settling were supplied by the Butchart Co., Joplin, Mo.

The designing and constructing engineers are Hawley & Freese, of Fort Worth and San Antonio, Tex.

As noted previously, contract for the work was let on April 1, 1929. It is now expected that the plant will be ready for acceptance from the contractor by May 1.



BUILDING SAN ANTONIO SEWAGE-WORKS

End of activation tanks is in foreground, with final settling tanks just beyond. Farther on is the official building, flanked at either end by the sludge-digestion tanks. One of the pair at the left is not shown.

Building a Rock Island Extension in Texas

New 60-Mile Line on Texas Plains—Fills Built by Tractor-Hauled Elevating Graders and Compacted by Rolling—Ballasting With Earth and Disintegrated Rock—Tracklaying With and Without Pioneer Car

By H. T. Livingston
Engineer of Construction, Rock Island Lines, Little Rock, Ark.

TO PROVIDE more direct railway service for a farming and ranching district in the "panhandle" district of Texas, the Chicago, Rock Island & Gulf Railway is building a line due west from Morse to Dalhart, a distance of 59.6 miles. The former place is on the company's new Amarillo-Liberal line, described in *Engineering News-Record* of Aug. 18, 1927, p. 252; while Dalhart is on the direct main line between Kansas City and Tucumcari, where connection is made with the Southern Pacific system as part of a through route from Chicago to Texas and California points. All of the land along the new line is tillable and most of it is held in large blocks for stock raising, but 60 per cent of the property adjacent to the line now has wheat in cultivation. A view of the completed railroad is shown in Fig. 1, while Fig. 2 is a map of the railways in the district.

From Morse, at El. 3,219, there is a gradual and continuous rise to El. 3,989 at Dalhart, the maximum grade against westbound traffic being 0.60 per cent, while eastbound traffic has a continuous descending grade. The sharpest curves are 3 deg., and the total curvature is 345 deg. Tangents have a total length of 56 miles, the longest tangent being 16.32 miles. Drainage is simple, as most of the openings have corrugated-iron pipe, and there are only 35 panels of heavy-loading pile trestle for eleven openings. Track is being laid with second-hand 80-lb. rail on creosoted ties, fully tieplated.

All highway crossings are at grade, as no obstruction to vision exists. Right-of-way fencing consists of four-strand barbed-wire stock fence on steel posts. Six intermediate stations will be built and a water station provided at Phillips, mile 27, where a well has been drilled and an electrically operated air lift installed to supply a 50,000-gal. tank, having a gooseneck spout to serve the locomotives. Grain elevators are being built at several of the stations, and at Altman, 20 miles, a townsite has been laid out in anticipation of gas and oil development.

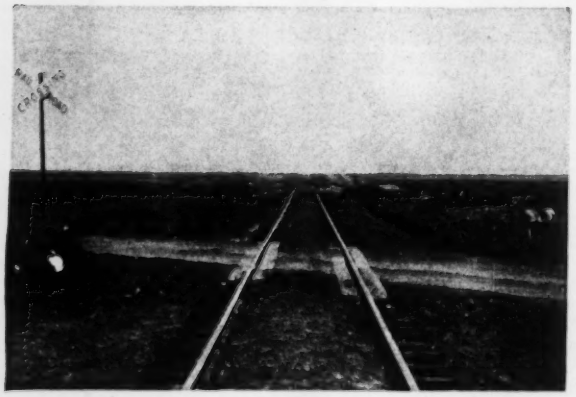


FIG. 1—FINISHED TRACK ON ROCK ISLAND LINE
Note earth ballast covering ties and sloped down under rails to ends of ties to give good drainage.

Grading—Owing to the small quantities of earthwork per mile, aggregating only 300,000 cu.yd. for the entire line, as well as the necessity for having the line in operation before the 1930 wheat harvest, it was imperative to adopt methods that would be economical and insure completion on time. Location was comparatively easy, as topography permitted following section lines for most of the distance. This work was completed in January, 1930; the contract was let during February, and grading started on March 3. The contract required that 5 miles

FIG. 2—RAILWAYS IN NORTHWEST TEXAS

at each end of the line be completed by March 31, and 15 miles at each end by April 30. These limits were more than met and the grading was completed ready for tracklaying for the entire 59.6 miles by May 1.

The specifications required the rolling of fills made by casting or dragline methods and a minimum of 6-ft. berm at base of fills. The embankment crown is 16 ft. wide, or 18 ft. on fills of 6 ft. or higher, with slopes of 1 on 1½. Cuts have a 20-ft. base with 1-on-1 slopes. As the contract provided that grading would be done on a waste and borrow basis, it obviated almost entirely the use of material from cuts in making fills. The maximum embankment height is 13 ft. and cut depth 7 ft., with very few cuts or fills exceeding 3 ft. These conditions permitted the use of tractor-drawn elevating graders on nearly all of the work. On fills of less than 4-ft. height the grader excavated material from side borrow-pits, casting earth directly into the fill. As the fill reached successive stages of 1 ft. in height, a 10-ton roller was operated to thoroughly compact the material. Excellent results have been obtained, as there has been little settlement or wash after rainstorms or under work-

FIG. 3—GRADING THE MORSE-DALHART LINE
Elevating grader at left. Tractor is in front of bunkhouse. Road crossing is being graded with fresno scrapers.

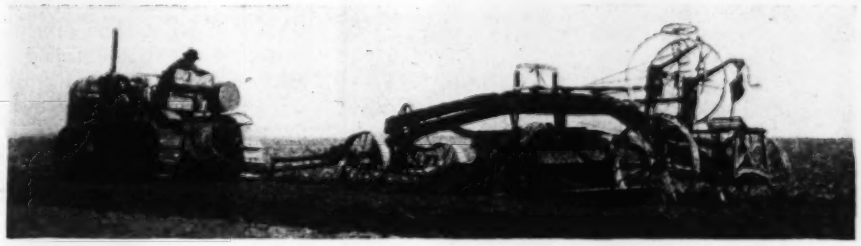


FIG. 4—FINISHING SUBGRADE WITH TRACTOR AND GRADER

train service. Fig. 3 shows a contractor's camp with tractor and elevating grader. Teams with fresno scrapers are grading a highway crossing.

On embankments of more than 4-ft. height the lower 4 ft. was installed by direct casting, the outer portion of the base being double-casted on account of length of elevator. The upper portion was then completed to grade by horse-drawn fresno scrapers, as the elevating graders were not able to cast material to greater heights or distances. In cuts the elevator cast the material out on the sides, except that when the depth was more than 4 ft. the lower portion was removed by fresnos. Various materials encountered included sand, sandy loam, gumbo, blue clay, topsoil, caliche (or disintegrated limestone) and a negligible quantity of solid rock. Final finishing to grade was accomplished by a tractor-drawn roadgrader or blader, as shown in Fig. 4.

With this mobile equipment, consisting of tractor-drawn elevating graders, rollers and finishing bladers, it was possible to secure economical and rapid performance. A small percentage of fresno work was done when machines could not function. There were a few days when tracklaying was delayed for grading at certain points, but the contractor was ahead of his schedule at these points, and no considerable inconvenience was experienced.

Tracklaying—This work, done by gangs organized under the railroad's construction department, was started at each end of the line about March 20. At the eastern end a Roberts tracklaying machine is used with an organization which requires a gang of twenty men at the material yard to load ties and fastenings on flat cars for use the following day with the machine. This outfit is shown in Fig. 5.

Ties are received at the material yard at Morse in stock, box and gondola cars. Rails are received on flat cars. All tie and rail cars in the tracklaying train must be flat cars to permit the use of trams or live-roll conveyors that carry the material forward. This train leaves the material yard at 7 a.m. with three cars of rail (more or less, depending on the available supply), eight to ten cars of ties, locomotive, water-car and caboose, made up in the order named. The rail-laying machine, or pioneer car, is left at the end of the track each evening. The material train couples on to it in the morning, trams are hung on the cars and connected to the driving shaft; the steam line from the locomotive is coupled to the engine driving the live-rolls of the trams or conveyors, and work proceeds without delay.

The tracklayer feeds rails ahead on the left-hand tram and ties on the right-hand tram. Men take ties from the tram and lay the full number of ties ahead. Other men place the rails, with angle bars half-bolted, installing temporary tierods or bridle rods to hold the rails to gage, as no spiking is done ahead of the train. A gang immediately behind the train does full bolting, spiking and uniform spacing of ties. As fast as this work makes track safe the bridle rods are removed and carried ahead. Places where unusually poor line and surface obtain are also taken care of by these men.

For tracklaying by this method the complete organization is as listed in Table I. No exceptionally long distances have been made, because the rails come from a rail relay point that has never furnished a maximum daily requirement. On several days more than a mile of track has been laid, and with a slight increase in force this organization can lay 2 miles of track daily if ample material is at hand. It was planned to have this end of the tracklaying completed by July 1, but it was actually completed early in June.

An entirely different method of tracklaying is used on the western end, as the new line joins the main track at Dalhart, which is a division terminal, so that work trains need be called only as needed, and no assignment of crews is necessary. The receipt of rail is less than

TABLE I—TRACKLAYING WITH PIONEER CAR, ROCK ISLAND LINES

Construction foreman, also in charge of surfacing gang laying rails and ties	..	1
Assistant foreman with pioneer car	..	1
Handling ties from train to grade	10	..
Handling rails and placing tierods	6	..
Placing angle bars and bolts	2	..
Rail-laying tram operators	2	..
Placing rail on trams from cars	6	..
Placing ties on trams from cars	8	..
Handling fastenings	4	..
Material checker	1	..
Water boy	1	..
Total with work train	40	..
Spiking and Surfacing		
Assistant foreman	..	1
Grading and full-spiking	27	..
Placing tieplates	4	..
Spot-lining and surfacing	8	..
Tightening bolts	8	..
Carrying tiebars ahead to work train	2	..
Water boy	1	..
Total	50	..
Material Yard		
Assistant foreman	..	1
Making up work train	20	..
Construction foreman	..	1
Assistant foremen	..	3
Total workmen	110	..

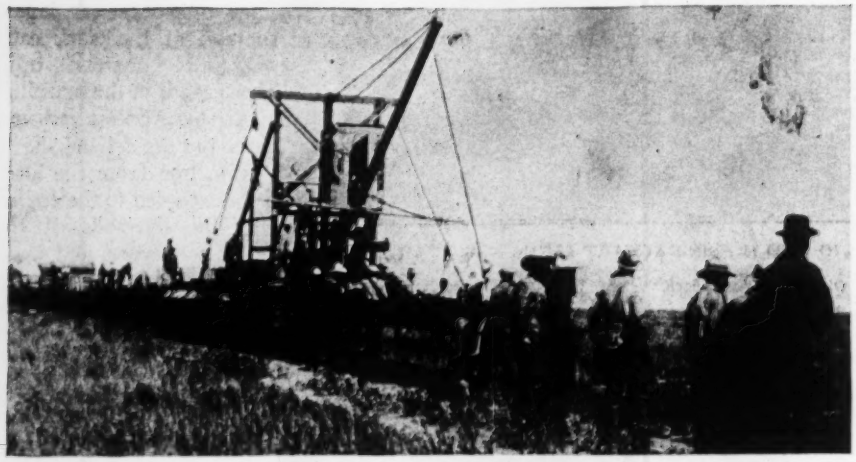


FIG. 5—TRACKLAYING TRAIN IN WHEAT FIELD
Pioneer car has two roller-conveyor troughs; the one on the left delivers ties and the one on the right delivers rails. The men in the foreground are ready to handle ties and distribute them on the subgrade.

can be laid daily. All ties are hauled ahead by motor trucks for as much as 4 miles and are delivered on the subgrade at a unit price per tie. A gang of men places the ties to track alignment and spacing. The general distribution of force consists of men placing ties, men laying rail from push cars, men handling the three push cars, the rail-layer and the material work train, and the follow-up gang full-spiking and bolting.

A gasoline rail-layer, self-propelled, loads push cars, the rails being unloaded and laid by hand. When one car is unloaded it is set off the track and the following car pushed ahead. As the track is downgrade from Dalhart, little effort is required to handle these rail cars. Then the rail-loader moves forward, replacing the rail cars on the track, and proceeds to near the end of the steel, followed by the work train, which carries rails and angle cars for the day's work, all other material having been transported by trucks. When the machine reaches the end of the steel, 36 rails are loaded on to the three push cars, and the operation of tracklaying is repeated. The organization for this method, exclusive of tie-trucking, is given in Table II. The best day's work by this method is 6,500 ft. of track.

Ballasting—It was planned originally to ballast the entire line with earth. This is being done easterly from Dalhart for 10 or 15 miles, where the soil contains considerable sand. The method used is to cast material with an elevating grader from side borrowpits into the center of the track, filling it level with the top of the rail and extending over the ends of the ties. A surfacing gang of 60 men under a foreman and assistant foreman gives the track a 3-in. raise on this earth ballast. After a few weeks' use by work trains, the track is given a final spot-surfacing, tamping, lining and dressing. The earth-ballast section is brought to about the level of the top of the rail in the center of the track and is dressed to bottom of ends of ties to insure drainage (see Fig. 1). It is expected that 2,000 ft. of track daily can be finished in this way.

FIG. 6—LAYING RAILS BY HAND
No pioneer car is used with this gang. Material train in rear. Track is laid directly on surface of prairie.

On the eastern end of the line earth was used for a few miles, but rains showed that the local soil was not suitable, and it was decided to use caliche (locally known

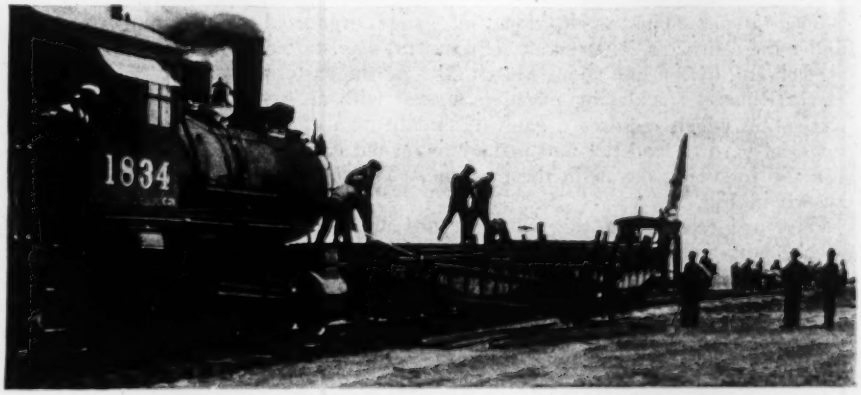


FIG. 7—UNLOADING RAILS BY HAND
Rail-handling crane then picks up rails from ground and loads them on push cars.

TABLE II—TRACKLAYING BY HAND

Laying Rails		
Construction foreman, also in charge of surfacing gang	..	1
Assistant foreman handling rail-laying	..	1
Handling rail with tongs	8	..
Heeling rails	1	..
Shimming rails	1	..
Lining rails	2	..
Pushing rail cars	3	..
Hanging joints on rails	2	..
Installing two bolts per joint	4	..
Tightening bolts ahead of work train	2	..
Spikers	8	..
Nippers	4	..
Machine operator	1	..
Loading rail on push cars	3	..
Unloading rail from flat cars	3	..
Total men	42	..
Bolting and Spiking		
Assistant foreman	..	1
Spacing ties	3	..
Spikers	16	..
Nippers	8	..
Bolters	3	..
Water boy	1	..
Total men	31	..
Tie Gang		
Assistant foreman	..	1
Unloading ties from truck	4	..
Laying and spacing ties	10	..
Unloading ties from cars	10	..
Total	24	..
Construction foreman	..	1
Assistant foremen	..	3
Total workmen	97	..

as "gyp"), which is obtained about 8 miles north of Morse on the Amarillo-Liberal line. This material is crumbling limestone containing some sand, and in some instances it has considerable nitrate content. It can be taken from the pit, without dynamiting, by steam shovel and loaded on self-cleaning ballast cars. Some delay is experienced in unloading on the track, as the material packs in the cars.

Here the track is raised 6 in. on the caliche, and the final dressing given is the same as that used with crushed stone. A 60-man surfacing gang under a foreman and an assistant foreman installs ballast and completes the work. It is estimated that twenty cars of material will be the average daily output and that an average of 2 miles of track a week can be ballasted and finished. Three work trains are in use: one for tracklaying, as already described; one to handle material, and one to haul and unload ballast.

Material Yards and Trains—As tracklaying progresses, the material yards at either end of the line are moved forward to the last station constructed. This relieves congestion at Morse and Dalhart and permits making up the east-end work train near the point of work. At this end the camp outfits and work train tie up at night at the material yard. The material train takes loads of water, oil and supplies for the camps to the advanced material yard and returns empty cars to Morse. On the west end it is necessary to move forward all material as new stations are reached, but only one work train is used as needed.

Fence material is unloaded from the work train at each mile post and is distributed by the contractor as fence is constructed.

Engineers and Contractors—Grading is being done by Petersen, Shirley & Gunther, of Omaha, Neb., and fencing by Killen & Casey, of Dalhart, Tex. Tracklaying is done by railway forces as described. The section buildings and station facilities are being built by the railroad's bridge and building force on the El Paso-Amarillo division, this force being temporarily loaned to the construction engineer. This work is done after track has reached the new stations to obviate the cost of transportation overland. Wells served by electrically operated air lift at one place and by gasoline-engine driven pumps at two places were let by contract.

The accounting and timekeeping is done by a special force organized under E. H. Pettibon and located at Dalhart. The whole project is under W. H. Petersen, chief engineer, Rock Island lines, with the writer as engineer of construction, while work in the field is under the direct supervision of Guy L. Murphy, construction engineer.

New Zoning Law for Los Angeles

Early Ordinance Covered Use Only, New One Restricts Heights, Limits Areas Covered and Standardizes Classifications

By Donald M. Baker

President, Board of City Planning Commissioners, and Consulting Engineer, Los Angeles, Calif.

A PIONEER in the regulation of property under the police power (zoning), Los Angeles has recently adopted a new ordinance, action being precipitated, as in New York some time ago, by an invasion of the garment trades into the central business district. Another compelling factor was the excessive area zoned for apartment houses.

In 1904, an ordinance prohibiting manufacturing in residential districts was put into effect. Shortly thereafter, other ordinances relating to use were passed, prohibiting slaughter houses, cemeteries and such objectionable uses from locating indiscriminately over the city. Little more than this was done until 1920, when, following the creation by ordinance of a planning commission consisting of 51 members, a zoning ordinance of a comprehensive nature, although limited to use regulation, was promulgated. This ordinance established five use zones: *A*, in which single-family residences, with one residence per lot, were allowed; *B*, in which multiple-residential uses, hotels, churches, schools and certain other similar institutions were permissible; *C*, which was the commercial zone; *D*, permitting light industries; and *E*, unrestricted.

Due to alleged constitutional inhibitions, no statutory procedure exists in California whereby a board of appeals can be created, such as exists in many cities to care for cases where "practical difficulties and unnecessary hardships" are caused by the strict application of the zoning ordinance. To care for this condition, the original use ordinance contained a section whereby the planning commission could, after a proper showing had been made, recommend to the city council that a conditional permit, in ordinance form, be granted to relieve the situation.

The 1925 charter created a department of city planning with a planning commission of five members, appointed for five years by the mayor and confirmed by the council, one member being appointed each year. It also provided that every ordinance regulating the use of land should be submitted first to the city planning commission for its recommendation, and that its recommendation could be overruled only by a two-thirds vote of the city council. Gordon Whitnall, who had been secretary of the original commission since its inception, was

appointed manager of the new city planning department.

Experience in the administration of zoning in other cities had by this time become crystallized and had developed certain quantitative and other facts, and the administration of the original use ordinance in Los Angeles had shown the existence of certain deficiencies in that ordinance. This original ordinance applied only to use of property. No regulation existed as to height of buildings, except a charter provision limiting the maximum height of same to 150 ft., nor was there any area limitation.

Other features of the original ordinance, which it had been found needed attention, were the procedure to be followed in making zone changes and variances, clarification of terminology and similar details. Opposition to the newly proposed ordinance, which was quite strong at first, took a considerable time to overcome, but the new legislation was finally adopted by the city council in May, 1930, and became effective in July.

This new ordinance took advantage of efforts on the part of those interested in city planning in Los Angeles County to standardize classifications, zone designations and symbols. Four residential zones were created, R_1 allowing one single-family residence and the usual accessories per lot, and providing that where the lot area is in excess of 10,000 sq.ft., one residence would be allowed thereon for each 5,000 sq.ft. of lot area. The R_1 zone is practically the same as the B or multiple-residential zone of the original ordinance, except that all apartment houses containing twenty or more units are required to provide on their premises garage accommodations for at least one automobile for each such unit.

The R_2 and R_3 zones are the first attempt to initiate height and area zoning in Los Angeles. The first of these zones allows up to four-family units on any lot having an area of less than 10,000 sq.ft., and when a lot has in excess of 10,000 sq.ft., not more than four families may be housed on each 5,000-sq.ft. thereof. It also provides that all such structures and every accessory over one story in height shall not cover more than 60 per cent of the total area of such lot, and that no structure thereon shall be more than two and one-half stories or 35 ft. in height. The R_3 zone, in addition to multiple dwellings, which are limited to a 60 per cent coverage on inside lots and 70 per cent on corner lots, and to four stories or 50 ft. in height, allows fraternity and apartment houses, churches, public and semi-public buildings, which are governed by the same height and area provisions. There is also a requirement similar to that in the R_4 zone relative to garage accommodations.

Two commercial zones are provided: C_2, which is designed to serve as a neighborhood business zone, allowing retail business, storage garages and similar uses; and C_3, allowing wholesale as well as retail business, repair garages, auto laundries, carpenter, paint, plumbing, etc., shops and similar uses. In this zone a limited amount of light manufacturing is allowed, controlled by the provision that not over 10 per cent of the rentable floor area of any floor of a building may be used for light manufacturing of a character not obnoxious, while if all of the goods manufactured are sold at retail on the premises, 15 per cent of the entire floor area of the building may be so used. Rentable floor area is defined as that used by the concern, exclusive of space used for window displays, waiting rooms, offices and clerical work. This classification cares very excellently for the downtown business district which has been classified in it. The C_1 zone was not included in the ordinance. It was a classification adopted in the standardization of zoning classifications in the Los Angeles metropolitan area and contains certain height limitations.

Additions and betterments may be made to buildings used for non-conforming purposes, provided that such additions conform to the use allowed in the existing zone classification and that the value of such addition shall not exceed 50 per cent of the assessed valuation which the existing improvement had on Nov. 1, 1921, or on the first date of its assessment. The new ordinance makes it mandatory to hold a public hearing upon all proceedings for change of zone, or on applications for a variance where the use requested will exist for in excess of two years. It also requires that notices of such hearings be posted in the area affected, and that postcard notices of such a hearing be sent to all property owners within a 500-ft. radius of the property in question.

Procedure and form of petition in zoning changes and variances are more clearly set forth than in the original ordinance, and the following three facts are required to be established in applications for a variance:

1. That there are exceptional or extraordinary circumstances or conditions applicable to the property involved or to the intended use of the property, that do not apply generally to the property or class of uses in the same district or zone.
2. That such variance is necessary for the preservation and enjoyment of a substantial property right in the petitioner.
3. That the granting of such variance will not be materially detrimental to the public welfare, or injurious to the property or improvements in such zone or district in which the property is located.

The clarification of issues involved is expected to greatly assist the commission in acting upon these proceedings.

In the preparation of the official zoning maps under the new ordinance, a system of symbols has been used, designating the actual zone in which each parcel of property is placed, such as R_1, R_4, C_3, M_2, as it has been found that this avoids confusion and error. Standard color designations are also used for wall and study maps. Standard use symbols, developed by the Los Angeles county-zoning study group, are used for use surveys. Accompanying each application for a change of zone or variance must be a map, on a scale of 200 ft. to 1 in., showing the use of each parcel or property within a 500-ft. radius of the property in question by means of such symbols.

At present two district maps, each 6 miles square, have been brought under the provisions of the new ordinance, and it is expected that shortly the entire San Fernando valley within the area of the city, upon which tentative zoning in accordance with the provisions of the new ordinance has been practically completed, will be given the protection of zoning. The remainder of the city will then be progressively brought under its provisions.

Thomas Coombs is acting manager of the commission, succeeding Gordon Whitnall, who resigned June 30, and Huber Earl Smutz is zoning engineer.

Research at Bureau of Standards

The laboratories of the Bureau of Standards in Washington, D. C., completed 200,726 tests during the fiscal year ended June 30, 1930, according to the annual report just made public. This corresponds to 173,512 tests in 1929 and 132,213 in 1928. Of the more than 200,000 tests finished during the past year, 62,348 were made for the public, 131,204 for government departments and state institutions, and 7,174 for the bureau itself.

Some Recent Points Decided in Engineering Law

REVIEWED BY HERBERT BRAASCH
Attorney at Law, New York City

DECISIONS reached in cases tried in the higher federal courts and in the state supreme courts are summarized in these articles appearing from time to time in *Engineering News-Record*. —EDITOR.

Illegality in Public Works Contracts

Street-repair work was let under contract by the city of Creston, Iowa, without competitive bidding, and the contractor completed the job in good faith. Iowa has the typical law requiring all contracts for construction or repair to be let only after due publication of notices. It was held that the contractor could receive no payment whatever, either on the express contract that was signed nor on an implied contract to pay the reasonable value of the services or materials furnished.

Usually such laws also prohibit contracts in which a public official has a financial interest, as where a district board employed one of its own members to supervise the construction of a school. The member carried out the work in very satisfactory fashion, but was allowed nothing for his services although he had a contract. All persons dealing with a municipal corporation are charged with notice of the limitations upon its power.—*Johnson County Savings Bank vs. city of Creston, Iowa.*

Competitive Bids and Patents

New Jersey has a common form of statute applying to contract letting of public works. It provides that whenever any patented proprietary pavement or paving material or ingredient is included in specifications, the board having the matter in hand must not specify such material or type of construction alone but must include in the specification as an alternate one or more equivalent types of construction on which no patent, condition or proprietary right exists, bids to be asked for on the various types so placed in competition, with award to be made to the lowest bidder.

Proposals called for Warrenite Bithulithic (a patented paving) and as alternates mentioned National (another patented pavement), and asphalt blocks on which there is no patent, condition or proprietary right. The low bid was for Warrenite, but the award was challenged on the ground that asphalt block was not an equivalent or proper alternate. All three pavements when put down are crushed stone cemented together with mineral pitch—they are all asphalt-concrete pavements. The patents are not upon the ingredients but upon processes of mixing and laying.

In Warrenite Bithulithic, stone of proper sizes is mixed with hot asphaltic cement, spread in place and not rolled. On this a finer-grain asphalt-concrete mixture is spread and rolled onto and into the lower mixture; in National, a layer of bitumen is spread on a foundation of crushed stone, rolled hot, topped with fine-grain asphalt concrete, rolled again and finished; in block paving, stone is crushed to suitable size, mixed with hot asphalt cement, pressed in shape and set like stone or brick in a mortar bed of concrete and squeegeed over with hot tar. All types are placed upon the same bed or foundation.

The court held that it did not matter that the ingredients and final results were the same. Placing asphalt blocks as an alternate did not allow the competitive opportunities intended, since the difference in cost of the finished roadways was apparent and fundamental. An alternate specification which would naturally and almost necessarily be higher than a selected patented pavement is not "an equivalent type of construction," and an award thereunder is unlawful.—*E. J. Flaherty Contracting Co. vs. town of Kearny, N. J.*

Corporations Engaging in Construction

Peter & Burghard Stone Co. procured a subcontract for furnishing interior stone and doing all marble work on a bank building in an adjoining state. Work was properly executed and advances were made, but a large balance was due the subcontractor when the general contractor died insolvent. The general contractor had given a surety bond covering and protecting subcontractors.

Peter & Burghard Stone Co. was not incorporated in Indiana where the company had carried on this building operation, nor had it taken the procedure that would qualify it to do business under the Indiana law. In these circumstances a corporation is without standing and cannot sue for money due it nor enforce contracts in a "foreign" state. Discovering this situation some time after it had completed the work and being unable to secure payment of its balance, the stone company followed such incorporation procedure as would qualify it to do business in Indiana and then brought action against the surety.

The surety contended that when the work was actually done the stone company had no legal standing in Indiana, and that a later compliance could give no validity to acts invalid when done. However, the claim against the surety was allowed on the ground that the incorporation laws here only relate to remedy or access to court aid, and compliance before an action is begun will suffice.—*Peter & Burghard Stone Co. vs. Carper, Ind.*

An individual or person contracting in his own name cannot be denied the aid of the courts of any state, but this privilege conferred by the United States constitution does not extend to corporations. This corporate disability may be avoided by sale or transfer of the claim to some person or to a domestic corporation.

Effect of "Formal Contract" Clause

Agostini Brothers obtained a contract for the construction of a post office at Yonkers, N. Y. Consolvo & Overmeyer, mason contractors, submitted a bid to which Agostini Brothers replied, "We hereby accept your estimate amounting to $25,000 to perform the following work according to plans and specifications in connection with the Yonkers post office. All the necessary limestone as per plans and specifications will be furnished by us f.o.b. cars Yonkers and all granite stone to be delivered at the building site; you are to do all hauling of limestone and the setting, cleaning, pointing and finishing complete of all lime and granite stonework. As soon as the contract is awarded to us we will enter into a contract with you in a more detailed form for the prosecution of the work. Very truly yours, Agostini Brothers. . . . We the undersigned agree fully to the terms and conditions as set forth hereabove and accordingly affix our signature. Consolvo & Overmeyer."

Agostini Brothers later wrote: "In re—Yonkers P. O. We have found the union here 100 per cent strong, and

they claim that the stonework, just the setting, cannot be sublet unless the subcontractor will perform all the masonry work. So according to this ruling, it seems that unless you will be interested to also bid on the brickwork we will have to have this work done by the day." Consolvo & Overmeyer at a later date brought an action to recover the profits that they would have made on the contract.

Agostini Brothers claimed no complete contract had ever been made, because there had never been any agreement as to these matters: (a) That only union men be employed; (b) that the work be done under union rules; (c) when the work should be started and completed; (d) that liquidated damages might be required; (e) that bond with a surety might be required; (f) mode of payment; and (g) how the liability insurance should be taken care of.

The court held there had been a contract complete in every material detail and awarded damages. The stipulation in Agostini Brothers' letter to embody their agreement in a formal contract does not affect its validity, and they have no right to use that stipulation to impose additional terms or obligations or to seek to evade the performance of the agreement.—*Agostini vs. Consolvo, Virginia.*

Railroads Have Large Investment in Trucks and Buses

AN INQUIRY by the Interstate Commerce Commission has revealed that the Class I railroads have a property investment of $40,048,607 in motor vehicles. The roads principally engaged in motor transport are the Southern Pacific, with an investment of $10,407,704; the Union Pacific, with $6,912,847; the Pennsylvania, with $6,643,970; the New Haven, with $6,450,185; the Texas & New Orleans, with $2,457,822; the Chicago & Northwestern, with $2,093,955; the Missouri Pacific, with $1,727,573; and the St. Louis Southwestern, with $1,247,020. These property-investment figures do not include the investment of contract operators carrying either passengers or freight for the railroads. Several railroads make extensive use of this latter class of service where local conditions make it more desirable.

The consolidated report of the motor operations of the railroads shows that in the first six months of 1930, 2,887 buses operating over 33,187 miles of intrastate and 23,040 miles of interstate routes carried 34,113,361 passengers, 5,090,561 of whom were traveling interstate and produced a revenue of $14,614,011, of which $3,371,391 was on interstate business.

Data on motor truck operations discloses that 551 trucks and 115 trailers operated during the first half of this year over 8,863 miles of intrastate and 1,546 miles of interstate routes, hauling a total of 413,259 tons of freight, of which 22,968 tons was interstate, for a revenue of $1,580,862. Of this sum $88,311 was derived from interstate traffic.

The report reveals continued expansion in both the bus and truck operations of the railroads in recent years. Passengers carried increased from 34,523,684 in 1927 to 46,909,960 in 1928 and to 62,863,524 in 1929. Passenger revenue rose from $6,866,475 in 1927 to $11,017,321 in 1928 to $26,799,883 in 1929. Freight hauled totaled 348,718 tons in 1927, 488,419 in 1928, and 693,572 last year. Freight revenue increased from $1,311,807 in 1927 to $1,734,831 in 1928 to $2,721,736. Further increase in the volume of both bus and truck business this year is indicated by the figures covering the period from January to June reported above.

The data on the motor-transport operations of the railroads were compiled from returns to a questionnaire issued in connection with the commission's current investigation into the coordination of rail-motor operations. Hearings in this inquiry commenced Nov. 17 in St. Louis and they will be continued for four months in seventeen cities.

Four Men Overcome by Gas at Kitchener Sewage Plant

ON SEPT. 2 four men lost their lives in the grit chamber of the sewage-disposal plant at Kitchener, Ont. Recently the grand jury which has been investigating the accident brought in a verdict in which it was stated that the men came to their death by accidental gas poison, but the character of the gas was not stated. In a report of the accident published by the *Canadian Engineer* it is stated that the gas is believed to have been hydrogen sulphide.

According to the account given by that paper, when the grit chambers of the plant at Kitchener show signs of containing considerable quantities of solids it is necessary to clean them for the purpose of protecting the slow sand filter beds. In discharging this material to the sludge lagoon the pumps will not draw the sludge from the whole area, as the slope in the bottom is comparatively flat. It has, therefore, been the custom from the beginning (the plant has been in operation for more than twenty years) for men to assist in pushing the sludge, aided by a stream of sewage, to the suction outlets.

On Sept. 2 the men entered one of the grit chambers, a vaulted room 36 ft. long by 12 ft. wide and 11½ ft. to the dome. The liquid had been lowered from the level of 6½ ft. to about that of the solid matter lying 2 ft. deep on the floor. The one opening to the outer air was a 30-in. manhole, the cover of which had been previously removed. The foreman entered the tank and considered it ready for cleaning. He came out and three men entered. At the same time a small stream of sewage was let in to aid in shoveling the solids. As soon as the solids were disturbed the men began to keel over, and in all four men, including a would-be rescuer, lost their lives.

Subsequent examination showed that the grit chamber contained a considerable quantity of organic sludge, which is somewhat unusual in this part of the disposal plant. Tests showed the material to contain substances capable of producing hydrogen sulphide in large quantities. This gas is dangerous in concentrations of more than 2,000 parts per million. Dr. F. M. R. Bulmer, of the department of health, found that the material present in the grit chamber was capable of producing concentrations of between 2,000 and 3,000 parts per million of hydrogen sulphide.

The grit chamber in which the accident occurred was said to have been cleaned about six weeks prior to the accident. The sludge was found to be decomposing, of acid character, containing a great many gas bubbles which were released when stirred.

The city of Kitchener has a new sewage-disposal plant under construction in which all sludge will be handled mechanically.

Letters to the Editor

A Forum for Discussion of Views of Engineers and Contractors

Polygonal Web Trusses

Sir—The title to Mr. VanVleck's article in the Oct. 30 issue, p. 690, "Auditorium Trusses Designed With Polygonal Web System," is rather a misnomer in that the truss shown is no more polygonal than the ordinary subdivided railroad or highway truss with sub-posts at the intermediate panel points. The stresses are all statically determinate and the members carry direct stress only. A polygonal web system would be one in which the shear in such a panel was carried by the chords in bending. The truss illustrated has a diagonal member in every panel and hence has a triangular web system.

E. L. DURKEE,
Structural Engineer,
McClintic-Marshall Co.

Pittsburgh, Pa.,
Nov. 10, 1930.

Decentralization and City Transit

Sir—Your editorial "Transportation in Cities" in the Oct. 23 issue, p. 637, excellently epitomizes the present-day city transit problem. ". . . . the importance of urban transportation is increasing sharply. No city claims to have reached a solution. . . . Everywhere transportation is too slow. . . . Increased expenditures for rapid-transit construction are therefore inevitable. . . . Transportation will continue to be the most critical problem of the large city . . ."

But is it true that cities do not of themselves "tend to decentralize" or that compulsory decentralization "offers the only avenue of escape from the hopeless complexities of the transportation problem?"

In every city of size centralization and decentralization are, and have been from the beginning, proceeding simultaneously. Both are evidences of unevaluated economic forces, which constantly are working to influence the physical configuration of the city. Decentralization, perhaps, has been accelerated in recent years, not necessarily because it is desirable, but because it has been forced.

Forced decentralization is visible evidence of a growing unrest with respect to the present order; a protest against the inconvenience of entering the central section for shopping and business. In this process points of congestion are multiplied, travel times for equivalent distances are increased, and the net efficiency of the city is lessened. All this is uneconomic.

On the other hand, there is what may be called healthy decentralization—the growth of neighborhood centers in answer to a local demand for business services. Such tendencies are desirable and may be promoted for the general good.

New York offers an example of the practical working of these forces. Manhattan has, in the last decade, lost about one-fifth of its inhabitants to the suburbs and other boroughs. Transit has not kept pace with the outward movement, and the growing inconvenience of travel has resulted in a return of population—now just commencing. The old Chelsea district has experienced a complete cycle: exclusive residences, low grade residences, business—and now exclusive apartments are being built. Forty-second Street at the East River, the Sutton Place district and Washington Square have gone through somewhat the same change and are becoming high type apartment sections for those who can afford to live close to business, the district eventually housing many more persons than formerly lived there. Retail business is slowly but surely advancing northward on Manhattan Island, approximately at the rate of ten blocks a decade and residences are retreating before the advance. In short, centralization and decentralization are going on at the same time.

These forces cannot be accurately directed, but they can, within limits, be controlled and molded to conform to the ideal of what a city should be. Transit is, perhaps, the most effective tool at hand. The travel facilities of our cities can and should be planned and built to provide convenience of access for every person and to every part of the city—one of the prime functions of the city—and when so ordered, it will grow as we would like it to, with benefits to the whole population. But if we complacently stand aloof in the hope that our cities will automatically decentralize wisely, and thus solve our problem, we shall very likely find that instead of an economic entity, there will remain only a haphazard city, which nothing but a major physical operation can improve.

HAWLEY S. SIMPSON,
Research Engineer,
American Electric Railway Association.

New York, N. Y.,
Oct. 28, 1930.

Weather Bureau Data Faulty

Sir—Relative to the editorial "Is Science Serving Engineering?" which appeared in your issue of Oct. 2, 1930, p. 518, you ask concerning my experience with work of the U. S. Weather Bureau.

The hydraulic engineers of the country, and particularly the irrigation engineers in the West, in making designs for works are dependent to a material extent on the records of the Weather Bureau, particularly as to precipitation as well as temperatures and floods. These data collected by the Weather Bureau I believe to be unsatisfactory.

First, referring to the Pacific Coast, with which I am familiar, the official stations of the Weather Bureau are located usually in comfortable buildings in the largest cities without reference to their proper distribution as to topography or hydrology of the region. These stations are either on the coast or in interior valleys and give no accurate idea of conditions in the regions from which we obtain our principal water supply. For instance, the station at Fresno, El. 293 ft., has an average annual precipitation of 9.39 in., whereas 50 miles to the east, in the Sierra Nevadas, the precipitation (which occurs in the form of snow) will amount to 50 to 60 in. per annum. Notwithstanding this great variation, there is not an official Weather Bureau station in the entire Sierra Nevada range of mountains in California.

In 1914 the Los Angeles section of the American Society of Civil Engineers appointed a committee to report on suggested changes and extensions of the U. S. Weather Bureau service in California. The report of this committee appears in *Transactions*, Vol. 81, p. 161. Among other findings it reports that "no regular stations are maintained within the productive drainage area of any important stream of the state, nor are any systematic scientific studies made of the subject."

In addition to the defective distribution of the official stations from a physical standpoint, the observation stations that are established in the cities are located nearly always on the tops of high buildings and do not represent the prevailing meteorological conditions that exist at that locality on the ground, where crops are grown and where people live. This is quite generally recognized as true. The following is a quotation from the discussion by the writer of the report of the American Society committee referred to above:

> There is available a rainfall record (in San Francisco) made by Mr. John Pettee, extending back to 1865-66. Although it is said that the gage observed by Mr. Pettee was moved to different parts of the city several times, it is believed that it was always established near the ground, as distinctive from the roof of a building. For the 27 years prior to 1892 the Pettee record shows a reasonably close relation to that of the Weather Bureau, being an average of 97.2 per cent of it. Subsequent to this date (when the Weather Bureau station was moved to the roof of the 11-story Mills Building) there was a decided difference in the ratio of the two records. For the period 1892-93 to 1900-01, the Pettee record was 134.4 per cent of the Weather Bureau record. This may not be taken as conclusive of the ratio of records maintained on the roofs of high office buildings and those observed near the ground, but it certainly indicates a wide difference in the results. Other examples could be referred to.

In the horticultural region, where frost temperatures are of vital importance, a correct record is especially desirable. It is recognized by the Weather Bureau people themselves that the temperatures taken on the roofs of steam-heated build-

ings are higher during winter months, frequently from 5 to 10 deg., than on the surface of the ground, and are cooler in summer. In Los Angeles we occasionally observe freezing temperatures in our yards in the winter and find the minimum recorded temperatures given by the Weather Bureau to be from 35 to 40 deg. Errors of this kind are wholly unnecessary, because there are abundant opportunities to make these observations on open ground surfaces.

Your editorial very properly calls attention to the fact that anemometer records showing the total mileage traveled by the wind give no adequate information as to the destructive wind velocities that occur and concerning which engineers should have information, either in designing structures or considering the physical features of a country.

The committee of the American Society at Los Angeles in 1914 found that "the placing of temperature, precipitation, and wind recording instruments on high buildings is practically without value to the agriculturist or engineer who attempts to use the data thus obtained."

Throughout the Southwest there are a great many voluntary Weather Bureau stations making reports to the Weather Bureau which are published in their monthly bulletins. With minor exceptions these stations have been equipped with instruments that are furnished by the voluntary observer and established by him in such places as he may select. They are not necessarily standard and are not inspected by the officials of the Weather Bureau as to their accuracy. The reason for the lack of inspection is given that funds are not available from Congress for this purpose. The result is that records are officially published that may or may not be correct.

In October, 1919, the writer sent a communication to *Engineering News-Record* from which the following quotation is made:

> I inclose a photograph of the rain gage and thermometer station at Bakersfield, Calif. (voluntary station). The records from this station are published by the Weather Bureau month after month and, I presume, year after year. It will be noted that the drooping trees which are above the rain gage will make particularly erratic any record obtained therefrom. The picture is of more interest because of the moral that it carries than because of the inaccuracy of the station. I have seen other stations that have been made fully as inaccurate by local change as this one, notably the building of a brick wall next to a rain gage at one of the oldest stations in southern California, at Escondido.

It is believed that, if the proper presentation of this situation was made to Congress by the chiefs of the Weather Bureau, appropriations could be obtained for adequate inspection, such as is constantly being done by the hydrographic branch of the U. S. Geological Survey at river stations.

The following quotation is taken from a letter to the writer by Thorndike Saville, Chapel Hill, N. C., referring to the Cape Fear River near Fayetteville, N. C.:

> Until the past two years the gage heights of the Weather Bureau were used in connection with computing discharge. Some discrepancies were found, and we then began to look into the records. We found that the chain length on the Weather Bureau gage had changed over a foot between successive periods of inspection. There was apparent no effort on the part of the Weather Bureau to check up on their chain lengths. We found also that the datum of the gage was not referenced to any definite benchmark. As a result we have had to place a large element of error in our low-water readings.

This again indicates the necessity for inspecting these stations, the records of which are officially published and used by engineers.

The U. S. Civil Service is advertising in the *Official Record* of Oct. 16, 1930, examinations for junior observer in meteorology ($1,440 to $1,800 a year) to fill vacancies in the Weather Bureau in Washington and throughout the United States. The notice states: "Applicants must show the completion of one year of a high-school course, or one semester of a college course, in physics." This certainly does not indicate a high standard upon which to gain admission into one of the scientific departments of the government.

The Weather Bureau should be the leader in research work looking toward long-time predictions of climatic changes. Various other state and national organizations are doing this, but as far as the writer is aware there is nothing commensurate with the scope of the Weather Bureau organization that is being done along these lines of original investigation. There are many competent and worthy men in the Weather Bureau organization. Local observers as a rule are courteous and helpful to the extent of their ability. It is said, however, that they are often restrained by rules and precedents in such a manner that they are unable to exert their natural abilities for the improvement of the service. The engineering societies of the United States would be fully justified in exerting their influence to improve the character of the service of the Weather Bureau.

Los Angeles, Calif., Nov. 1, 1930. J. B. LIPPINCOTT, *Consulting Engineer.*

Sevilla Hangar Replica of Those at Orly

Sir—Being faithful readers of your magazine, we were keenly interested in the article in your issue of Aug. 28, 1930, on the construction of a reinforced-concrete hangar at Sevilla, Spain. We were, however, much surprised to note that the first hangars of this type, constructed by our company in 1920 at Orly, near Paris, are not mentioned in this article. We send you inclosed a description of the construction of these hangars, photographs of which have appeared at different times in your magazine. Examination of this description shows that the Sevilla hangar is only a copy of the Orly hangars, with some modification of detail. It should be interesting to point this out to your readers, who in reading your article were led to believe that this type of hangar is entirely new and original.

SOCIÉTÉ ANONYME des ENTREPRISES LIMOUSIN.
Paris, France,
Oct. 11, 1930.

Buildings Cracked by Drought?

Sir—Since the latter part of last July we have received numerous calls, particularly from the owners of residences, complaining about cracks in brick walls, foundations, plaster, cement walks, etc., which mysteriously appeared in every instance at about the same time. At the beginning of our investigations we were at a loss to account for the wholesale cracking of residential buildings due to settlement of foundations. In every case we found that the foundations were designed sufficient to support the loads imposed under normal conditions.

Several of the buildings affected have been standing for eight to ten years without any previous indication of foundation settlement. A thorough analysis of the situation influenced the conclusion that the long drought after an unusually dry spring (we had rains only 69 per cent of normal in June and 66 days, from July 1 to Sept. 5, without any appreciable rainfall), together with temperatures far above normal for June, July and August, caused the drying out of the foundations on which the buildings rest and a consequent shrinkage of the soil. The shrinkage of clay due to drying out will range from 5 to 25 per cent, depending on the porosity, the normal percentage of water in the clay, etc.

While the clay of foundations was in the shrunken state the foundations naturally conformed to the deformation of the soil and settlement resulted. Now that the clay has absorbed its normal percentage of water, expansion to normal volume has occurred; and consequently no further settlement will occur from the conditions imposed by the drought unless, of course, another extended dry spell takes place to cause a recurrence of the trouble.

No doubt other buildings in St. Louis and elsewhere in the drought area have suffered from unsightly cracks. One fine residence in St. Louis which we inspected was rendered unsightly (but in no danger of failure) because of numerous cracks extending from roof to cellar.

I do not believe that owners of buildings who have experienced this recent display of cracks in walls, need be alarmed. A normal amount of rainfall has eliminated the cause of the trouble.

St. Louis, Mo., Nov. 12, 1930. W. J. KNIGHT, Consulting Engineer.

News of the Week

Cause of Corpus Christi Dam Failure Still Undetermined

Although the water has receded from the break in the Corpus Christi dam, the cause of the failure, which occurred on Nov. 21 *(Engineering News-Record,* Nov. 27, 1930, p. 861), cannot be determined until the steel sheetpiling cutoff wall is further uncovered, according to word received from S. W. Freese, of Hawley, Freese & Nichols, consulting engineers on the project. The north abutment of the concrete overflow section and 60,000 cu.yd. of embankment were lost when the dam went out. Apparently the abutment had been undermined, and examinations are now being made to determine the condition of the sheetpiling. One theory advanced by the engineers attributes the cause of the break to an earthquake shock several weeks ago springing the sheetpiling and permitting excessive seepage through the gravel foundations to undermine the abutment and ultimately cause its failure. A committee composed of John A. Norris, chairman, Texas state board of water engineers, R. J. Cummins and Henry Exell Elrod, both consulting engineers of Houston, has been appointed by the city of Corpus Christi, owner of the dam, to conduct an investigation in cooperation with Hawley, Freese & Nichols.

Annual Report Notes Increase in Work of Army Engineers

Over $100,000,000 Spent on Rivers and Harbors — Higher Rank for Division Engineers

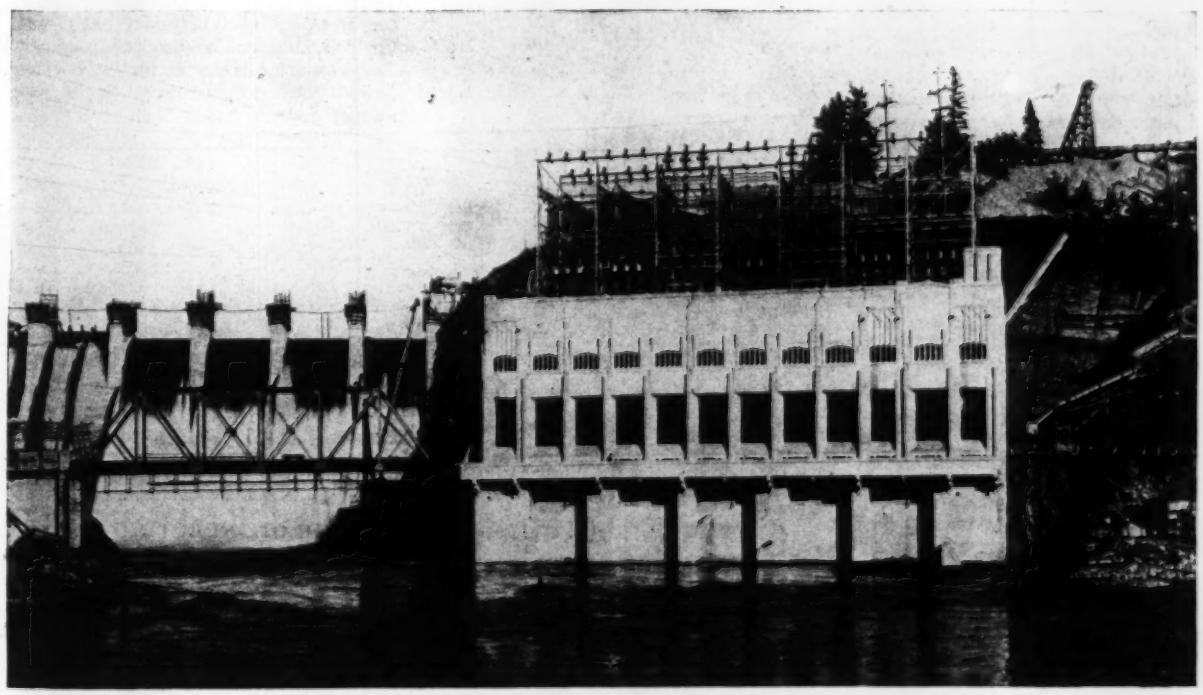
AN INCREASE of 30 per cent in the amount of money expended for river and harbor improvements, including flood control, for the fiscal year ended June 30, 1930, is noted in the annual report of Major-Gen. Lytle Brown, Chief of Engineers. The report, which totals 2,312 pages including a 53-page index, can be obtained from the superintendent of documents, Washington, D. C., for $3 a copy. It lists a total of 930 approved projects now under the supervision of the Corps of Engineers. Active work during the fiscal year was prosecuted on 330 of these, including the maintenance of 50 canals and waterways, flood-control work on the Mississippi and Sacramento rivers, and construction and maintenance at Muscle Shoals. In addition, the report notes that the rivers and harbors act of July 3, 1930, authorized work on 175 new or modified projects. Total expenditures of the Corps of En-

(Continued on page 898)

Southfield Sewer Project in Pontiac Held Illegal

By a decision of the Michigan circuit court the Southfield trunk sewer project has been held to be illegal and an injunction has been issued restraining Drain Commissioner Spencer from proceeding with the work. Bonds aggregating $2,730,000, issued and sold to pay for the sewer, are declared to be invalid, and if the decision is upheld by a higher court, to which an appeal has been taken, the money received from assessments for the sewer must be returned. The court held that the work was illegal because the drain commission was without authority to attempt to construct a trunk sewer. The sewer was to take care of sewage from southern Oakland county.

Application to construct the sewer was first received by the drain commissioner on Aug. 3, 1926. Condemnation proceedings were brought to gain the right-of-way, and the contract for construction was awarded on May 28, 1928. Suits brought by the village of Oak Park, the Houseman-Spitzley Corporation, Leonard B. Kinnear and a number of other property owners halted work on Sept. 29, 1928. The two contractors, S. A. Healy and R. D. Baker, did $260,000 worth of work. Of this amount $152,000 has been paid.



RUSKIN DAM AND POWER PLANT NEAR VANCOUVER

The first 47,000-hp. hydro-electric unit in the Ruskin plant of the British Columbia Electric Railway Co. on the Stave River near Vancouver, B. C., was put into service recently. The illustration shows the spillway and the first section of the power house. Ultimately the power house will accommodate four units of 47,000 hp. each.

Work of Army Engineers

(Continued from page 897)

gineers for the fiscal year were $100,746,269.84, the larger items of which are given in the accompanying table. An additional amount of $306,938,275 is estimated as the cost of completing authorized work.

Figures are presented in the report indicating the extent of water-borne commerce during the calendar year 1929. It is stated that 583,800 tons of freight, with an estimated value of over

MAJOR RIVERS AND HARBORS EXPENDITURES
Year Ended June 30, 1930

	New Work	Maintenance	Total
General improvements:	$43,863,173	$20,549,503	$64,412,676
Surveys	1,775,900	.....	.....
Flood control: Mississippi River	20,006,833	3,565,238	23,572,071
Tributaries	256,512	308,347	564,859
Sacramento River	653,942	103,666	757,608
Surveys	1,560,870	.....	.....
Expenditures of contributed funds	1,195,098	92,538	1,287,636

$24,000,000,000 was transported over the nation's waterways, in addition to a total of 546,573,443 passengers. (Apparently this latter figure includes ferry traffic.—EDITOR.)

All of the $30,000,000 appropriation provided by Congress for flood-control work on the Mississippi and its tributaries was expended or obligated. This sum was used chiefly for levees, revetments, contraction works and dredging on the main river. The work of surveying the tributaries of the Mississippi is said to be about half completed. Satisfactory progress is noted in the system of comprehensive surveys of nearly 200 rivers for the general purpose of their improvement for navigation in connection with the development of water power, the control of floods and the needs of irrigation. This work, also, is about half completed.

Increased Rank for Division Engineers

General Brown includes in his report a recommendation that each division engineer be given the rank and pay of a brigadier-general because of the heavy responsibility incident to the position. This rank would be held only during incumbency, and would be independent of the officer's permanent rank in the Corps of Engineers. It is noted that the engineer in charge of the Lower Mississippi Valley division, who is also president of the Mississippi River Commission, now holds this rank and it is felt that other officers with equal responsibility merit the same consideration. General Brown also recommends the consolidation of the divisions along the Atlantic and Pacific seacoasts into a single unit for each territory, reducing the total number of divisions in the corps from eight to six. Believing that six districts should be the maximum number under the direct supervision of one officer, he recommends the establishment of a new grade of supervision and coordination providing for the appointment of deputy division engineers in the larger divisions.

In the report General Brown asks Congress to appropriate $36,400,000 for flood-control work in the fiscal year beginning next July, and also $60,000,000 to be spent on improvement and maintenance of harbors and waterways, a total of $96,600,000. The same amount as this year, $35,000,000, should be allotted to protection projects on the Mississippi and its tributaries, and the Sacramento River, in California, will require $1,000,000. The sum of $18,000 is asked for the California debris commission and $260,000 for operation of Dam No. 2 on the Tennessee River at Muscle Shoals.

Los Angeles to Buy Five Towns in Water Development

Plans of the city of Los Angeles to purchase five towns in the Owens Valley, Inyo County, Calif., as a part of the city's water-development program have been given the approval of the state supreme court in a decision affirming a lower court judgment sanctioning the proposed purchase. A test case was brought questioning the right of the board of water and power commissioners to make the purchase of the town properties of Laws, Bishop, Big Pine, Independence and Lone Pine, which was made possible by the voting of the $38,800,000 bond issue in Los Angeles, May 20, 1930 *(Engineering News-Record,* May 29, 1930, p. 909).

Negotiations for the purchase have been under way for about two years and appraisals have been made. The adjusted value as finally set by the water and power commissioners under a resolution of Sept. 24, 1929, was $5,798,780, being raised from $4,597,832. The right of the board to increase the price was one of the points upheld by the court in the test suit.

Public Employment Service for Boulder Dam

The employment service of the U. S. Department of Labor, in co-operation with the State of Nevada, has established a public employment service at Las Vegas, Nev., present headquarters for Boulder Dam, with Leonard L. Blood as superintendent in charge.

This office will not only direct men to employment but will supply the country with information concerning the progress of work on the Boulder project and the demand for workmen. The department of the interior and this organization will cooperate to keep the country informed of activities and give authentic information as to the employment situation.

The contract for construction of a power plant and for building a railroad over which building materials will be hauled will be let about March 1, and the contract for the dam and appurtenant works will be let so that employment will begin after April 15.

Coast-to-Coast Paved Highway Promised in Canada

At a recent convention of the Canadian Association of Tourist and Convention Bureaus, held in Winnipeg, the delegates were informed that the long-hoped-for trans-Canada highway would soon be realized. Mayor Webb, of Winnipeg, disclosed that at an unemployment conference of Western mayors with Premier Bennett the premier had given definite assurance that the dominion government was prepared to participate in the completion of the highway on a fifty-fifty basis with the provinces. The premier predicted that within ten years the highway would be paved from the Atlantic to the Pacific.

TWIN DIESEL POWER PLANTS DRIVE OIL-ELECTRIC CAR

Two diesel power plants, each connected to a generator, provide electric current for driving this rail car, which has been placed in service by the Erie Railroad between Youngstown and Dayton, Ohio. The unit has a maximum speed of 80 m.p.h., and will maintain a speed of more than 50 m.p.h. with four 40-ton trailers. It measures 75 ft. in length, weighs almost 100 tons and is divided into three sections, for driving machinery, mail and baggage. Its fuel oil tank capacity is sufficient for a 1,000-mile trip. Heat for the baggage and mail sections, as well as for the cars being pulled, is provided by a separate oil-fired steam boiler located in the baggage section. The oil-electric drive machinery was built by the Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa., and applied to a body supplied by the St. Louis Car Co.

Unemployment Fund Formed by General Electric Co.

Every employee of the General Electric Co., from president to office boy, who is working 50 per cent or more, will contribute 1 per cent of his December wage to the company's new unemployment fund, and the company will match such contributions dollar for dollar, it is announced by President Gerard Swope.

Under the rules of the unemployment plan, as originally announced, payments were not to be made for at least six months after its inauguration, which would not be until next January or February, but because of the unemployment emergency it was decided to start relief in December but to limit payments to a maximum of $15 per week to employees needing assistance. It has also been decided to consider for assistance employees who may not have contributed to the plan but who are in need. Approximately 35,000 employees have been contributing to the fund and on Dec. 1 they had paid in $350,000.

D. B. Prentice Made President of Rose Polytechnic

Donald B. Prentice, dean of Lafayette College, Easton, Pa., has been appointed president of Rose Polytechnic Institute, Terre Haute, Ind. After graduation from the Sheffield scientific school (Yale) with the degree of Ph.B. in mechanical engineering in 1910, Dean Prentice was employed by the Britton Co., of Hartford, Conn., for two years, and the following four years was assistant instructor in mechanical engineering at Yale. In 1916 he became assistant professor of mechanical engineering at Lafayette. The following year he was made professor of mechanical engineering and has been head of that department since that time. Since 1921 he has been chairman of engineering, and in 1924 became dean. During the year 1926-27 he was acting president.

Dean Prentice was awarded the degree of mechanical engineer by Yale University in 1914, and in 1927 he received an M.A. degree in education from Lafayette College.

Suspended Monorail Transit Receiving Consideration

The planning commission of the Borough of Queens in New York City, following a careful survey of the suspended monorail system of rapid transit as applied to the conditions in Queens, has adopted a resolution which it is reported has been forwarded to the board of transportation and the board of estimate of the city of New York, asking that an official study of this system be made. In Pittsburgh the city council adopted a resolution asking for reports from the public works department and the transit and planning commission on the feasibility and practicability of the suspended monorail system. This system consists of a monorail elevated structure from which cars are suspended 15 ft. or more above the street. The system upon which estimates were made by the Queens planning commission consisted of a double-track line with a capacity equal to a double-track New York subway or elevated road and consisted of a series of T-shaped towers carrying at each end of the T-arm a 30-in. I-beam for supporting the rail.

The system has been used for some years in Germany on a 30-mile line connecting the towns of Barmen, Everfeld and Bohwinkel, in the Ruhr district. It is being introduced in this country by Frank S. Lyon as president of the Atlantic Suspended Monorail Corp. It has been proposed that a trial line be constructed on the right-of-way of the Whitestone branch of the Long Island Railroad in Queens, a request for the abandonment of which has been granted by the interstate commerce commission, with the provision that suitable substitute transportation be provided.

LARGE WYE FOR SEATTLE

The large steel plate wye, pictured here, has been delivered at Seattle's hydro-electric project on the Skagit River for use in the penstock leading to the Diablo power house. It was designed by the city's engineering staff and was fabricated by the Commercial Boiler Works, of Seattle. The main portion of the wye is 19½ ft. in diameter, and the two pipes into which the main pipe divides are each 15 ft. in diameter. To enable the wye to resist the unbalanced pressure to which it will be subjected, it is bound with three steel bands, and will be embedded in reinforced concrete. Water from the reservoir back of the new Diablo dam will flow through a tunnel 19½ ft. in diameter, 2,000 ft. long. The wye will be located at the outlet of this pressure tunnel. From the wye two steel penstocks will descend 189 ft. to the power house, where they will supply water to hydro-electric units of 85,000 hp. each. The Diablo plant will have a full head from dam to waterwheels of 325 ft.

A.S.M.E. to Appoint Committee to Stabilize Employment

In response to a request from Arthur Woods, chairman of President Hoover's emergency committee on unemployment, the American Society of Mechanical Engineers, at its 51st annual meeting in New York this week, voted to appoint a committee of five to conduct a nation-wide investigation "to ascertain, first, the ways and means adopted by employers throughout the country to stabilize unemployment during this period, and second, what they have done to stabilize employment permanently." The society will then undertake to urge industry to adopt measures now to relieve the winter emergency, will compile data as to effective policies and methods used to deal with the general question of irregular employment and "will assist in all other practicable ways."

Albert P. Greensfelder to Head A.G.C.

Nomination of Albert P. Greensfelder, of St. Louis, and William A. Starrett, of New York, as president and vice-president at large, respectively, of the Associated General Contractors of America for the year 1931 was announced following a special meeting of the nominating committee at the association's national headquarters in Washington, D. C. The nominations, which are tantamount to election, will be officially acted upon at the twelfth annual convention of the association, which is to be held during the week of Jan. 25, at San Francisco.

Both Mr. Greensfelder and Mr. Starrett have been nationally prominent figures in the construction world for more than a score of years and have personally supervised some of the largest construction projects of that period. They will succeed Anton E. Horst, of Philadelphia, and James E. Cashman, of Burlington, Vt., incumbent president and vice-president, respectively, who after having received the honor of nomination to succeed themselves at the fall meeting of the association's executive board at Rye, N. Y., were obliged to withdraw their names because of the pressure of their private business affairs.

British Columbia to Construct Coastal Highway

The minister of public works of British Columbia announces that definite plans are being prepared for the construction of a highway on the Pacific Coast north from Vancouver to the town of Powell River. The route will be about 100 miles long and two motor ferries, at Howe Sound and Jervis Inlet, will be necessary. Government engineers are now locating the final stretches of the highway and the terminal points for the ferries.

Van Norman in Charge of Los Angeles Water and Power

What is considered as the first step toward the reorganization of the Los Angeles department of water and power was taken by the commissioners on Nov. 25 when the joint divisions of the department were placed under the authority of H. A. Van Norman, chief engineer and general manager of the bureau of water-works and supply. The joint divisions are those such as land purchasing, commercial, bookkeeping and warehouses that perform services for both the water bureau and the power bureau.

For nearly a year past the authority has rested in the hands of E. F. Scattergood, chief engineer and general manager of the bureau of power and light. A clause in the resolution of the commissioners provides that policies affecting the character of service rendered to a bureau are to be determined jointly by the two bureau managers.

A survey of the operation of the Los Angeles water and power department by impartial experts employed by the board of water and power commissioners has been agreed upon by members of the board and committees of the city council. Outside technical experts will be engaged immediately by the board, and they will make such recommendations as they deem necessary and will advise the city council.

It was pointed out that the investigation is to be one of methods and not of personnel of the departments.

Work Resumed on Hetch Hetchy Coast Range Tunnel

Progress in the construction of the Hetch Hetchy Coast Range tunnel, which was retarded for some months following the Mitchell shaft accident of July 17, 1930 *(see Engineering News-Record*, July 24, p. 149 and July 31, p. 189), is now averaging about 85 per cent of the rate attained previously. Work has been resumed in all but one of the headings. The total distance excavated in the fourteen headings to and including Nov. 18 was 80,540 ft., out of a total length of 150,557 ft. The progress is at the average rate of 150 ft. per day. Gunite lining has been placed in about 7,500 ft. of the tunnel, where lining was immediately necessary to support unusually heavy ground in which the cost of timber maintenance was high. This work is being continued.

Following the gas accident in the Mitchell shaft, it was decided that a very large part of the equipment previously used underground should be replaced with new equipment of the so-called permissible types. It is estimated that the delay in the completion of the tunnel resulting from the retardation of progress while awaiting the new equipment and from operation of the new safety rules will amount to at least six months. It was formerly expected that the tunnel would be ready for service at the beginning of 1933, but under the present circumstances it is not likely to be ready until the latter half of that year.

The Business Outlook

Business shows more definite signs of having hit that hardpan resistance level which, in the past, it has always encountered at about 20 per cent below normal. Though basic industrial activity is still declining, general trade has begun to expand at somewhat more than the seasonal rate. Consumer demand for homes is sustaining construction activity at a time when it is normally declining, and there are signs that small residential building is definitely on the up grade. Money turnover is rising, commercial loans are expanding, currency circulation is increasing with seasonal retail trade demand. Key commodity prices are firmer as resistance to further deflation grows. The bond market is steadier as bank buying improves.

—The Business Week, Dec. 3.

Steel Plate Manufacturers Organize Association

At a meeting in Pittsburgh on Nov. 21 a trade association of steel plate fabricators was formed to be known as the Institute of Steel Plate Construction. According to J. W. Poushey, 33 West 42d St., New York, acting secretary, plants controlling 70 per cent of the steel-plate fabrication capacity of the country have expressed an intention to join. The organization will deal with all questions affecting the industry, promote efficiency and economy, compile and distribute information, establish trade standards and develop new uses for steel plate and assist generally in furthering production and distribution of steel-plate commodities.

Charles F. Abbott, executive director of the American Institute of Steel Construction, was the principal speaker at the Pittsburgh meeting. George P. Bard, of the Tippett & Wood Co., presided. The directors of the institute are: A. C. Caverno, Lancaster Iron Works; William S. Wheeler, Pennsylvania Engineering Co.; B. P. McDaniels, McClintic - Marshall Co.; George McAleenan, McAleenan Bros. Co.; George P. Bard; George Horton, Chicago Bridge & Iron Works; S. E. Fairchild, Jr., Cruse Kemper Co.; A. M. Duncan, Cole & Duncan; J. A. Connelly, Petroleum Iron Works, and W. R. Guest, Birmingham Tank Co. The next meeting of the organization is scheduled for Dec. 5 at the Engineers Club in New York City.

Montreal Creates Commission to Pass on City Improvements

A technical commission of experts to advise the city and the public-works department on all public works and improvements has been created in Montreal. The commission will be composed of S. A. Beaulne, J. E. Blanchard, S. J. Fortin, J. M. Robertson, R. S. Lea, R. de L. French and Lucien Dansereau. The commission will be given the aid of the town planning commission, and all projects for city improvements will be passed upon by the new body.

Winter Schedule of Baltimore Engineering Societies

A series of joint meetings which will be addressed by prominent engineers has been arranged by the Maryland sections of the American Society of Civil Engineers, the American Society of Mechanical Engineers, the American Institute of Electrical Engineers and the Engineers Club of Baltimore. The first meeting was addressed by C. E. Keefer, sewage-disposal engineer of Baltimore, who discussed sewage treatment in Europe. The next meeting, which will be held on Dec. 10, will be addressed by J. T. Thompson, of Johns Hopkins University, who will speak on "The Freyssinet Method of Arch Construction."

A civic affairs symposium will be held in January under the direction of Charles F. Goob, chief engineer of Baltimore. Robert Ridgway, chief engineer, board of transportation, New York, will be speaker in February.

"Some Broader Aspects of Modern Highway Development" will be discussed by Thomas H. MacDonald, chief of the U. S. Bureau of Public Roads, at the March meeting. The hydro-electric developments of the Pennsylvania Water & Power Co. on the Susquehanna River at Holtwood and Safe Harbor will be discussed at the April meeting.

Work Begun on Freight Terminal in Los Angeles Harbor

Construction of the West Basin freight terminal in Los Angeles harbor, which includes building a 1,260-ft. wharf, dredging a ship channel and laying two ship-side railroad tracks, has been begun. The terminal was designed by George F. Nicholson, harbor engineer for Los Angeles, and is planned to provide two 630-ft. berths. A single steel transit shed more than 1,000 ft. long and 120 ft. wide will be provided with shipload refrigeration units as well as a fireproof storage chamber for assembly of single shiploads of case-oil products.

In designing the bulkhead for the pier, Mr. Nicholson utilized both concrete and steel sheetpiling. The sheetpiling will present a solid bulkhead, reinforced first by concrete waling strips and also by

70-ft. structural steel tie rods running from the bulkhead back to concrete anchors.

The Merritt-Chapman & Scott Corporation has the contract for construction of the terminal, which is expected to cost about $1,500,000.

Oregon Must Protect Irrigation Needs on Klamath River

If and when the State of Oregon enacts such legislation as will guarantee that any future appropriation of the waters of Klamath River will not interfere with the requirements of reclamation and irrigation projects within the district, the reclamation commission of the state may grant the application of the California Oregon Power Co. for a permit to use the waters in question for the purpose of establishing and operating hydro-electric plants along the stream. This, in effect, is the opinion of the state attorney-general in reply to a request of the governor for legal instruction as to the reclamation commission's jurisdiction regarding the right to dispose of approximately 1,500 sec.-ft. of water which was ceded to the federal government and is now being held in trust for the exclusive use for irrigation development and power projects for irrigation purposes.

Brief News

CONSTRUCTION of a bridge at Evansville, Ind., has been stopped by a decision handed down in an injunction suit in the state superior court. The court ruled that the board of county commissioners had no right to award the contract to the National Concrete Co., of Indianapolis. The company had already torn down half of the old bridge before work was stopped.

WORK on the Welland Ship Canal has progressed sufficiently that vessels will now be permitted to load to a draft of 18 ft. The former limit was 14 ft. Present canal-sized vessels now carrying an average of from 85,000 to 90,000 bu. of grain will be able to increase their loads by 25,000 or 30,000 bu.

A SPECIAL EXHIBIT memorializing the life and scientific achievements of Elmer A. Sperry, inventor of the gyrocompass and more than 350 other inventions in virtually every major field of science and industry, opens on Dec. 1 for one month's showing at the Museums of the Peaceful Arts, New York City.

BELIEVED to be the largest single arc welders are the mobile 600-amp. gasoline-driven units which have been shipped to oil pipe lines in the field near Tulsa, Okla.

CONSTRUCTION of a pipe line which will supply natural gas from the Alberta fields to Regina, Sask., will be begun immediately by Tri Cities Utilities, Ltd., which recently closed a contract to supply the city. The line will be 357 miles long and will entail an expenditure of $20,000,000. The company also contemplates a further extension of 32 miles to connect with Moose Jaw.

BAD COAL and good coal, exactly alike in appearance, are being made to sort themselves out of the pile by electricity on a machine devised by the Westinghouse Research Laboratory. The heap of anthracite is shoveled on a moving electrified belt and as it tumbles off the end between two electrified plates, the good coal falls in one heap, the poor slate coal in another.

WASHINGTON NOTES

BY PAUL WOOTON
Washington Correspondent

Comptroller General Warns Against Insertion of Restrictive Clauses In Public Construction Contracts

BECAUSE of the reliance that is being placed in an expanded construction program as an unemployment relief measure, various attempts are being made or considered to insert clauses in public contracts requiring the contractor to show preference to labor in the section in which the work is being done, to give first thought to veterans, or to observe wage scales prevailing in the various communities.

A recent letter of the comptroller general to the secretary of the interior concerns the language in the Boulder Dam act requiring that preference shall be given in work done under the act to the employment of veterans of former wars. After calling attention to the fact that the revised statutes dealing with public contracts are designed to secure full and free competition, the comptroller general states that extreme caution should be observed in the insertion of limiting and restricting clauses, even though they may be in the public interest. Instead of putting limiting clauses into the contract proper, the comptroller general believes that it would be more in keeping with orderly procedure to include a notification that preference should be shown to various classes of labor in the advertised specifications for bids.

Should Notify Bidders

By stating in the advertised specifications that certain conditions are to be observed in the prosecution of the work, the comptroller general contends that prospective bidders will thus be given a notification in advance of the factors that they must observe and will be able to compute their costs accordingly. Whatever the opinion of the comptroller general may be, notice already has been served by members of Congress that they will demand passage of legislation changing the form of the public contract act so as to grant certain favors to the communities in which public work is to be done.

One of the bills that has been put forth to secure additional benefits to local communities from public work is the Bacon bill. This measure is designed to limit the activities of roving contractors by requiring that preference shall be given to local organizations and labor in letting contracts for public work. Another bill introduced by Representative Sproul, of Illinois, during previous sessions, goes even farther. The Sproul bill provides that wage scales for work on federal construction projects shall be the same as those prevailing for the same kind of labor in the community where the work is being done.

Terminals for Bus Lines

In order to prevent traffic congestion caused by the parking of interstate buses in downtown Washington, the public utilities commission and the commissioners of the District of Columbia have embarked on a program to force the bus lines to construct one or more union bus terminals. The police powers of the city will be invoked to route the bus lines through less congested areas, according to present plans. In this manner it is believed that the bus lines will be induced to construct terminals and waiting rooms.

War Department Has Latitude in Awarding Contracts

In holding that the government may take into consideration the responsibility and technical qualifications of an organization or persons controlling a corporation which has put in a bid for public work, the comptroller general has rendered a decision which it is believed will have an important effect on the construction program. The decision was handed down in connection with the appeal of the United Dredging Co., low bidder on a levee contract in the Vicksburg district, over the award to another company.

The comptroller general ruled that the war department was within its rights in refusing the award to the low bidder because of the evidence accumulated by the army engineers to show that the company did not have the proper engineering equipment to complete the work in the specified time. The controversy had its inception in the cancellation by the war department of a levee contract in the Vicksburg district that had been let to the Orleans Dredging Co. Claiming that this company was behind in its schedule, the war department took over the work and readvertised it for bids. It developed that the United Dredging Co. was a low bidder on the readvertised work. The engineer officers in charge of the work, however, refused to grant the award to the United Dredging Co. on the ground that this company is controlled by the Standard Dredging Co., which also controls the Orleans Dredging Co.

Since the United company, according to the evidence presented by the army engineers, would not be able to intro-

duce new equipment or new personnel, the comptroller general holds that the war department was justified in withholding the award of the contract to this company, even though it was the low bidder. The comptroller general also held in this case that the showing of financial resources alone should not constitute the sole factor in awarding flood-control contracts.

Personal Notes

SUMNER P. WING, formerly designing engineer in the construction department of the British Columbia Electric Co., Vancouver, B. C., has joined the staff of the U. S. Bureau of Reclamation in Denver, Colo., as designing engineer. Mr. Wing, who reported for duty Nov. 17, will work on the details of the Boulder Dam.

RAY SCOGGINS, for the last three years assistant engineer of the special construction department of the Byllesby Engineering & Management Corporation, stationed at Marshfield, Ore., has accepted a position as manager of the newly organized Sales Engineering Co., agent for manufacturers of engineering equipment, in Seattle, Wash.

E. C. LARUE and B. F. JAKOBSEN have dissolved the partnership of La Rue & Jakobsen, consulting engineers, Los Angeles, Calif. Both will continue practice as consulting engineers, Mr. La Rue specializing in water-supply problems and Mr. Jakobsen specializing in dam design, irrigation and flood control.

W. H. EDWARDS, of Baltimore, for a number of years connected with the engineering department of the Baltimore & Ohio Railroad, has resigned to become the general superintendent of the Lehigh & New England Railroad. He succeeds Charles W. Brown, who has been named general manager of the Western Maryland Railway. Mr. Edwards was graduated from Bucknell College in 1913.

RALPH C. MILLER, acting assistant chief engineer of the Pennsylvania Railroad at Philadelphia, Pa., has been appointed general superintendent of the southwestern division, with headquarters in Indianapolis. Mr. Miller succeeds Oliver R. Reese, who died recently. He was graduated in civil engineering from Ohio State University in 1901, and has been affiliated with the Pennsylvania Railroad since that time.

STANLEY M. HAWKINS has returned to the home office, in Buffalo, N. Y., of the Frederick K. Wing Co., after a little more than three years' residence at Fredonia, N. Y., during which time he had charge of the construction of a sewage-disposal plant and trunk sewer system and a water-filtration plant for the village of Fredonia. He also had charge of the lakefront improvement for the city of Dunkirk, N. Y., which included the construction of a sewage-disposal plant, a pumping station, an intercepting sewer and a 7,200-ft. lake wall.

GEORGE R. CLARK, road engineer for Tyler County, W. Va., has resigned to give his attention to private business.

CHARLES H. PURCELL, who has been highway engineer for the State of California for the last four years, has been reappointed by Governor-elect Rolph.

LAWRENCE H. TAYLOR, formerly district maintenance engineer, California highway department, with headquarters at Redding, Calif., has been appointed maintenance engineer of the Oakland, Calif., street department.

Society Calendar

AMERICAN ROAD BUILDERS ASSOCIATION, Washington; annual convention and road show, St. Louis, Mo., Jan. 10-16.

AMERICAN SOCIETY OF CIVIL ENGINEERS, New York City; annual meeting, New York, Jan. 21-23.

ASSOCIATED GENERAL CONTRACTORS OF AMERICA, Washington; annual meeting, San Francisco, Jan. 26-28.

ENGINEERING INSTITUTE OF CANADA; annual meeting, Montreal, Feb. 4-6.

NATIONAL CRUSHED STONE ASSOCIATION, Washington; annual convention, St. Louis, Mo., Jan. 19-22.

NATIONAL PAVING BRICK ASSOCIATION, Washington; annual meeting, Pittsburgh, Pa., Feb. 4-6.

NATIONAL SAND AND GRAVEL ASSOCIATION, Washington; annual convention, St. Louis, Mo., Jan. 27-29.

AMERICAN ASSOCIATION FOR THE ADVANCEMENT OF SCIENCE will hold its annual meeting in Cleveland, Ohio, Dec. 29-Jan. 3. The sessions of Section M will be held on Dec. 30-31. Among the papers to be presented in this section are: "Engineering Culture," by the retiring vice-president, H. F. Moore; "Education of the Engineer After Leaving the University," by W. E. Wickenden; "Engineering Education as It Affects the Engineer's Place in Society," by Arthur E. Morgan; "Salt Penetration in Tidal Rivers," by Harold H. Thomas; "The Problem of Sewage Treatment and Water Purification on the Great Lakes," by J. W. Ellms; "Some Scientific Problems in Connection With Design of Dock for the Goodyear Zeppelin Corporation at Akron, Ohio," by Wilbur J. Watson.

ASSOCIATION OF WESTERN STATE ENGINEERS, at its annual meeting recently held in Denver, Colo., elected as president Edward Hyatt, since 1927 state engineer of California and chief of the division of water resources of the state department of public works.

ENGINEERING PROFESSION IN BRITISH COLUMBIA, the association of professional engineers of that province, will hold its annual meeting on Dec. 6 in Vancouver.

ILLINOIS ASSOCIATION OF HIGHWAY AND MUNICIPAL CONTRACTORS will hold its 24th annual convention in Chicago, Dec. 10-12.

LOS ANGELES SECTION, American Society of Civil Engineers, was host at a joint meeting of members of the American Society of Civil Engineers, American Institute of Electrical Engineers, American Society of Mechanical Engineers, and American Institute of Mining and Metallurgical Engineers in Los Angeles on Nov. 12. F. E. Weymouth, chief engineer, Metropolitan Water District of Southern California, read a paper describing the various routes under consideration for bringing Colorado River water to the communities of southern California.

ROCHESTER SECTION, American Society of Civil Engineers, and the Rochester Engineering Society held a joint meeting on Nov. 13. Arnold G. Chapman, chief engineer, Albany (N. Y.) Port District Commission, addressed the meeting on "Port Development."

Obituary

GUSTAVE MAURICE BRAUNE, dean of the school of engineering in the University of North Carolina since 1921, died on Nov. 26 of pneumonia. Dean Braune was born at Eutaw, Ala., in 1872, studied at Spring Hill College and at Washington and Lee University and received his civil engineering degree from the Royal Polytechnic of Dresden, Saxony, in 1895. He began his active engineering work as a draftsman with the Union Bridge Co. Later he served as bridge engineer of the Southern Bridge Co., of Birmingham, Ala., from 1898 to 1903. Between 1903 and 1912 Mr. Braune was engaged in bridge design work on the New York State Barge Canal, as chief engineer of the B. H. Hardaway Contracting Co., and as president of the Braune Contracting Co. In 1912 he joined the faculty of the University of Cincinnati, remaining there until he went to the University of North Carolina in 1921. Dean Braune was a member of the American Society of Civil Engineers and was a director from 1925 to 1927. He was also a member of the council of the Society for Promotion of Engineering Education from 1925 to 1928 and vice-president in 1928-29.

RALPH STARRETT, president of the construction concern of Starrett Bros., Inc., of Chicago, which is affiliated with Starrett Bros. & Eken, New York City, died of heart disease on Dec. 1, at the age of 62. Mr. Starrett had been a builder throughout his adult life. Among his largest projects are the Carey Tower in Cincinnati and the Union Station in Washington. He was a brother of Paul and William A. Starrett, of New York.

JAMES STEWART CRINKLEY, of Memphis, Tenn., president of the Crinkley Construction Co., died on Nov. 29. Mr. Crinkley had been engaged in highway construction since 1894, first in Harriman, Tenn., later in Memphis and under his direction his company became one of the best known construction concerns in the South.

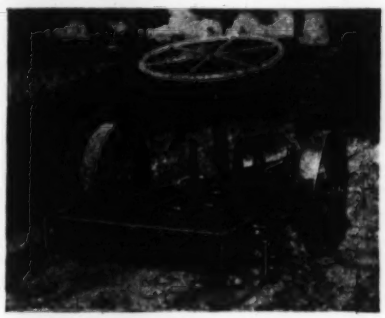
WALTER J. TOWNE, chief engineer, Chicago & Northwestern Railway, died on Nov. 23 of pneumonia. Mr. Towne was born in 1868 at Leavenworth, Kan., and received his engineering education at Rensselaer Polytechnic Institute, Troy, N. Y., where he was graduated in 1895. After his graduation he was for four years assistant engineer on the New York State canals, resigning 1899 to become connected with the Chicago & Northwestern Railway.

A. B. NEUMANN, of Chicago, consulting engineer, died in Düsseldorf, Germany, on Nov. 28, while on a business trip in connection with the design of steel works for the U.S.S.R. Mr. Neumann, who was 60 years old, was a native of Norway, went to Chicago in 1928 and was connected with the construction of the steel works at Gary, Ind. He was a member of the Western Society of Engineers.

Construction Equipment and Materials

Grade-Ripper Control Simplified

Dangerous operating levers on the Trojan* grade-ripper, manufactured by the Contractors Machinery Corp., Batavia, N. Y., have been eliminated in favor of a rugged worm gear and wheel control which makes it possible for one



SCARIFYING DEPTH CONTROLLED BY WHEEL

man to regulate the depth of cut while the machine is in motion. This new feature not only increases the safety of the device but also eliminates the time lost in stopping for adjustment. In addition, the Trojan grade-ripper is equipped with a new method of tooth attachment which not only holds the tooth in a definite prearranged position but defines the angle of entrance to assure best results. The machine is built with seven double-pointed teeth, any or all of which can be used, depending upon the amount of power available and the type of surface to be scarified. A universal hitch is provided for easy attachment to the tractor.

Wear-Resisting Metal Developed

To meet more adequately the severe wear encountered by chains and buckets in material-handling equipment, the Jeffrey Manufacturing Co., Columbus, Ohio, has developed a means of processing malleable iron to give a product known as Supermal, which, according to the manufacturer, develops greater resistance to wear, higher tensile strength and higher elastic limit than heretofore developed in malleable iron. At the same time the desirable characteristics of toughness and ductility are retained. Physical characteristics of the new metal, as compared with other materials used for similar purposes, have been tabulated by the manufacturer as follows:

Material	Yield Point (Lb. Per Sq.In.)	Ultimate Strength (Lb. Per Sq.In.)	Elongation (Per Cent in 2 In.)	Brinell Hardness	Scleroscope Hardness
Malleable iron	30,000*	50,000*	10.0 min.*	121	25–30
Soft cast steel, annealed	30,000	60,000	24.0 min.	140	25–30
12% manganese steel	50,000	85,000 min.	35.0	200	35†
Supermal	51,000	65,000	8.0	180–200	40–45

*Minimum standard set by American Society for Testing Materials.
†Heat treated but not cold worked. Cold working increases scleroscope hardness on the surface to about 70.

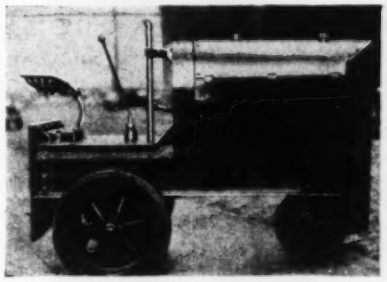
Chains, attachments and buckets utilizing Supermal can now be furnished by the Jeffrey company in all standard sizes.

Chlorination Rate Controlled by Automatic Device

Apparatus for an entirely new type of automatic control for chlorination, developed by the Wallace & Tiernan Co., Inc., Newark, N. J., is now available. This utilizes the orthotolidin test, generally accepted as the criterion of correct chlorinator operation. The tests are automatically made at ten-minute intervals and the amount of residual chlorine in the treated water is recorded on a chart. Any fluctuation in flow, or in chlorine demand, is immediately compensated for by the automatic controller. The manufacturer states that recorded residual chlorine curves show no appreciable lag between charged chlorine demand and the automatic adjustment of chlorine flow. The apparatus is available as a full automatic chlorinator, or the residual recording unit may be secured separately and used in conjunction with existing chlorinator equipment.

Three-Wheel Industrial Tractor

Using standard Ford parts for all wearing parts except brake and chain drive, the Sterling Tractor Equipment Co., 62 Bush St., Brooklyn, N. Y., has designed a light three-wheel tractor for industrial uses. This machine is easy to maneuver, as it has an over-all length of only 76 in., a wheelbase of 44 in. and a turning radius of 58 in. It is equipped with the Ford model A industrial motor, Ford three-speed transmission, Ford worm-drive truck rear end and Ford battery and starter. Steering



LIGHT INDUSTRIAL TRACTOR

is by means of an arm rather than a wheel so that the operator will always know the position of front wheel. The unit develops a maximum speed of 20 m.p.h. with the motor turning at 1,000 r.p.m.

Self-Contained Gasoline Motor Drives Portable Tool

Gasoline power has been adapted to such tasks as breaking concrete, driving sheeting, loosening frozen ground, tamping and similar purposes by means of a machine developed by the Rodax Corp., 2199 Lumber St., Chicago, Ill. The unit consists of a single-cylinder air-cooled gasoline motor, with only three moving parts, to which is attached any standard 1⅛-in. tool such as is used with pneumatic machines of this type. Around the base of the cylinder is mounted a semicircular gasoline tank which feeds

BREAKING CONCRETE WITH PORTABLE GASOLINE TOOL

by gravity to a carburetor immediately below. Starting is by means of a push handle on the top of the cylinder. The only connection necessary for operation is an electric cable for the ignition current, furnished by dry cells and a coil contained in an ignition box. The machine weighs only 87 lb., and is capable of striking 1,000 blows per minute.

Hangars Built of Steel Sections

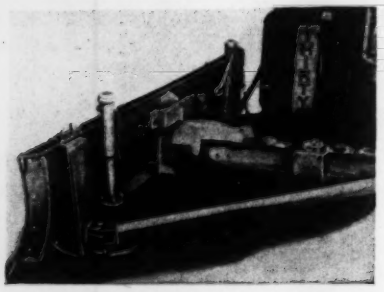
Short steel sections of the lamella type, which can readily be assembled by unskilled labor, are now being distributed by the Lamella Roof Syndicate, Inc., 45 West 45th St., New York City, for use in many types of buildings and for the construction of airplane hangars. For the latter purpose the lamella truss, when assembled, is covered with galvanized metal or any of a number of other types of surfacing. Advantages claimed for this type of hangar include easy transportation to the site, simple foundations, quick assembly and dismantling, and a form which minimizes the effect of wind pressure. The hangar is designed for dead load plus a snow load

ASSEMBLED FRAMEWORK OF STEEL HANGAR

of 15 lb. per square foot and a wind load of 25 lb. per square foot. In addition, a monorail crane can be hung from the center of the truss.

Plow-Backfiller Blade Improved by Pivot Mounting

Many improvements have been made in the combined blade plow-backfiller attachment for Caterpillar tractors manufactured by the LaPlant-Choate Mfg. Co., Inc., Cedar Rapids, Iowa. These include a newly designed blade pivot box which allows the blade to oscillate



BLADE ATTACHMENT USED AS PLOW, BACKFILLER OR BULLDOZER

freely at all times; a chain adjustment at each end of the blade which holds the latter down to the desired level; a moldboard with an improved roll to dispose of the material with the least possible effort; increase in ground clearance to 10 in. with the blade at an angle, or 12 in. when set for bulldozing; and a special optional side wing for use when the soil is subject to cave-in or as a bumper blade to minimize the tendency of the main blade to draw in too deeply. As the illustration shows, the blade is equipped with a center pivot mounting which makes it possible to put the entire weight of the backfiller on the tractor, thus making it instantly portable. The frame supporting the blade surrounds the tractor, and is attached by means of an oscillating sub-axle carried on the center of the track frame, the point least affected by the rise and fall of the driving unit. Mushroom shoes are provided to prevent the blade from digging in. Control is by means of a hydraulic system provided with an oil pump attached to the power take-off of the tractor. Three models are available for attachment to Caterpillar tractors, models, 20, 30 and 60. Weights of the units vary from 4,050 to 8,305 lb.

New Publications

Snow-Removal Equipment—Snow plows for attachment to motor trucks and tractors of various makes are described in a 56-p. illustrated catalog 290 of the BAKER MFG. Co., Springfield, Ill.

Heating Tanks—Electrically heated vertical coating tanks for asphalts, tars and similar substances are discussed in an 8-p. leaflet issued by H. O. SWOBODA, INC., 3400 Forbes St., Pittsburgh, Pa.

Pipe Protection—The importance of proper cleaning before the application of coatings to pipe lines is thoroughly discussed in a 38-p. illustrated booklet, "How to Add Years to the Life of Steel Pipe Lines," published by the W-K-M Co., INC., Houston, Tex.

Concrete Pipe—Equipment and methods used in the manufacture of corrugated concrete pipe are discussed in a 42-p. illustrated bulletin of the MCCRACKEN MACHINERY Co., Sioux City, Iowa.

Water Treatment—HUNGERFORD & TERRY, INC., Clayton, N. J., have issued a 36-p. bulletin on water-purifying apparatus, including softening equipment. This outlines present methods of treating water to fit it for industrial use.

Cranes—Engineering data on the selection, construction and use of all types of cranes are contained in an unusually complete 160-p. handbook published by the WHITING CORP., Harvey, Ill., which is being distributed at $2 per copy. The book is handsomely bound in flexible leather, and is profusely illustrated.

Transmission Line Surveying—A German instrument known as the Kuppers Sag Meter, used in the determination of the height of transmission lines and supports and the sag of overhead cables, is described in an 8-p. illustrated bulletin issued by the AMERICAN ASKANIA CORP., 1024 Marine Bank Building, Houston, Tex.

Cement—"Alpha Cement—How to Use It," a 112-p. handbook on the manifold uses of portland cement, has been reissued in enlarged and improved form by the ALPHA PORTLAND CEMENT Co., Easton, Pa. This handbook contains many valuable data on the mixing of concrete, the use of reinforcement, the construction of forms, concrete blocks and piles, cold weather pouring, and a large variety of other subjects.

Welding—Directions for welding Monel metal and pure malleable nickel are given in a 12-p. illustrated booklet published by ALLOY WELDING PROCESSES, LTD., Forest Road, London, E. 17, England.

Lumber—WEST COAST LUMBERMEN'S ASSOCIATION, 364 Stuart Building, Seattle, Wash., has published the first unit of a Douglas fir structural handbook being prepared by its technical staff. The present volume contains design data for the use of architects and engineers. It has been issued in advance of the rest of the handbook to make this information available to designers as soon as possible. The volume, which is bound in cloth, is known as the "Douglas Fir Use Book" and is being sold at $1 per copy. The 204 pages are occupied almost entirely by load tables worked out for various grades of Douglas fir in accordance with American lumber standards.

Lumber—"American Douglas Fir and Its Uses" has been issued in a Spanish edition by the national committee on wood utilization of the U. S. Department of Commerce. It may be obtained at 20c. per copy from the superintendent of documents, Government Printing Office, Washington, D. C., or from any of the district offices of the Bureau of Foreign and Domestic Commerce.

Drills and Hoists—Bulletins have been issued by the SULLIVAN MACHINERY Co., 400 No. Michigan Ave., Chicago, Ill., describing the following pieces of equipment: models 10 and 50 diamond core drills, model L-6 rotator rock drill, Turbinair portable hoists and the Sullivan Cathead, a winch operated by compressed air or steam. "Core Drilling by Contract" is another publication describing the service rendered by the drilling department of the company in the making of test borings and mineral prospecting.

Motors—As an aid in the selection of heavy-duty engines and power units, the HERCULES MOTORS CORP., Canton, Ohio, has issued two new bulletins containing advice as to the selection of the proper type of Hercules power plant for any given requirement. One of these contains specifications and illustrations of typical motor applications; the second consists of a series of charts of motor characteristics.

Employment—"How to Get a Job in Engineering," by Francis W. Wilson, is the title of a booklet now being distributed by the WILSON ENGINEERING CORP., Cambridge, Mass., at 50c. per copy. This contains 79 pages of pertinent advice on securing employment and is written with particular reference to the engineer or draftsman in search of a job. While the methods outlined are by no means new, the logical and clear way in which they are described should make the book of real assistance.

Explosives—A motion picture film, "Blasting the Water Highways of America," showing the work being done in New York Harbor and on the Great Lakes to keep waters safe for navigation will be loaned, free of charge, to any interested party upon application to the motion picture bureau of E. I. DU PONT DE NEMOURS & CO., INC., Wilmington, Del. The film is one reel in length, requires 15 minutes for showing, and is available in either standard or amateur size. It is the fourth of a series on engineering construction to be issued by this company.

TUNNEL SERVICE CAR HAS REVERSIBLE DRIVE

This unusual truck, built for emergency service in the new vehicular tunnel between Detroit, Mich., and Windsor, Ont., carries complete wrecking, fire-fighting and first-aid equipment. The propelling mechanism drives through four wheels so arranged as to allow either end to be the forward end of the vehicle. Two complete steering gears are provided, each controlling one set of wheels. There are clutch, brake and accelerating pedals at each driving position, but only one gear shifting and one emergency brake lever, common to either driving position. The truck is designed to haul a total load of 15 tons up a 5.2 per cent grade at the rate of 4 m.p.h. Unloaded, its top speed is between 20 and 25 m.p.h. It was built by the Four Wheel Drive Auto Co., Clintonville, Wis.

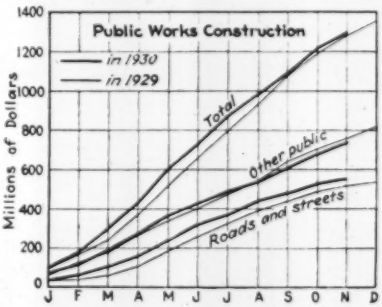
The Business Side of Construction

November Construction

November awards of engineering construction contracts were at the rate of 47 million dollars per week, compared with 49 in October and 59 millions in November, 1929. The rate for the year was 63 millions per week, compared with 79 in 1929 and 70 in 1928.

The drop this year has been entirely in private building construction, amounting to 49 per cent for industrial and 39 per cent for other buildings. The drop in November from a year ago was 49 per cent for industrial and 28 for other buildings. Contracts for private structures exclusive of buildings amounted to 8 millions last month and 14 millions a year ago; cumulative figures are 409 for 1930 and 376 for 1929.

Public contracts totaled 87 millions, or 46 per cent of November engineering



construction, compared with 90 millions, or 38 per cent, a year ago. The cumulative total is 1 per cent above that of 1929. Only sewers, buildings and unclassified structures are below last year's volume. Bridges and excavation are 14 per cent above; roads 9; waterworks 4; federal government 5 per cent.

Materials Notes

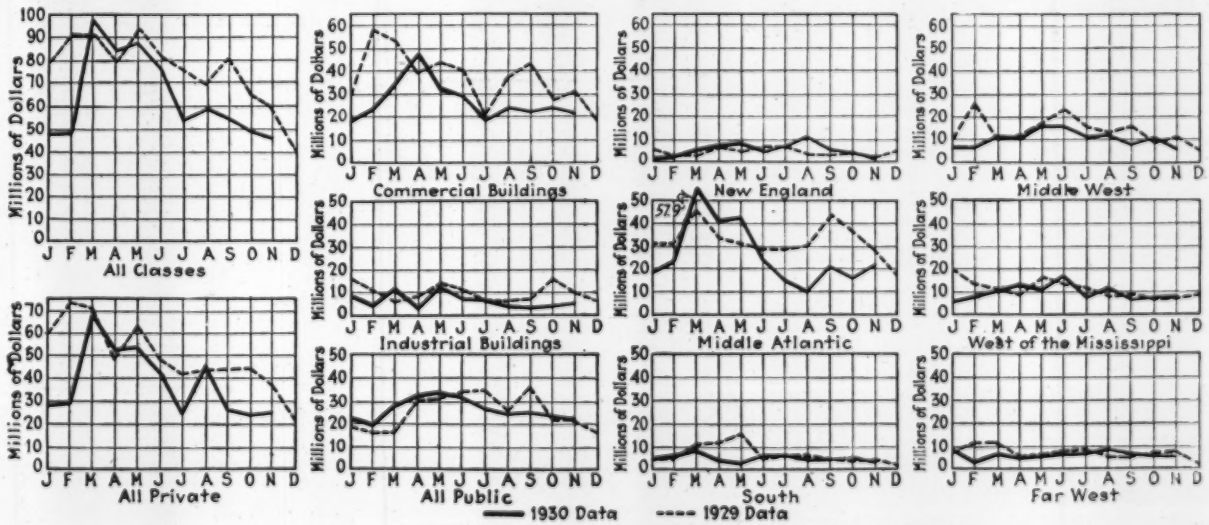
A number of building materials producers seem to feel that higher asking prices might start a buying streak. This was tried recently and unsuccessfully in the case of wholesale copper, and is likely to be tried soon in steel. Sewer pipe is another material having an upward price tendency. Elsewhere among the materials there is depression to the point of still lower quotations, as in tile, lime, cement, ties, nails, metal lath and wood blocks.

Cement—A special survey of the cement industry by the U. S. Bureau of Mines stresses the facts of rapidly increasing plant capacity, smaller shipments, larger stocks and steadily decreasing prices. The average mill price has declined gradually from $1.81 per barrel in 1924 to $1.48 at the end of 1929. In 1930 there has been little change in the average mill price for the country. Small chance of price increase is seen in a market with an ever-increasing supply and a decreasing demand. Moreover, since September cement has been coming in from Belgium at the rate

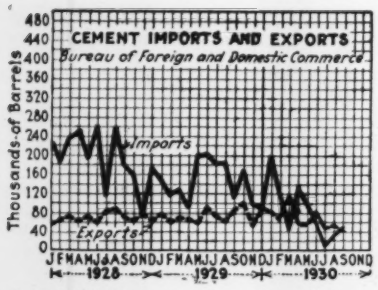
ENGINEERING CONSTRUCTION CONTRACTS REPORTED IN NOVEMBER, 1930

Thousands of Dollars (000 omitted)

	New England	Middle Atlantic	South	Middle West	West of Mississippi	Far West	United States Nov., 1930	United States Eleven Months 1930	United States Eleven Months 1929	Canada, Nov. 1930
Water-works	$159	$616	$615	$246	$589	$1,783	$4,008	$46,321	$45,394	$513
Sewers	743	1,572	383	1,464	260	225	4,647	76,520	83,471	239
Bridges, public	230	4,062	188	1,164	1,383	122	7,149	103,001	91,875	1,811
Excavation	130	29	3,578	406	1,926	2,454	8,523	30,614	27,376	169
Streets and roads	819	3,708	5,093	5,725	7,665	2,788	25,798	551,343	515,759	1,484
Federal government	654	2,011	1,812	1,295	1,828	1,123	8,723	104,145	100,870	.....
Unclassified, public	260	8,498	25	2,680	87	255	11,805	100,637	125,011	518
Buildings, public	4,545	5,559	1,204	3,172	1,320	735	16,535	276,925	284,839	742
Total public	7,540	26,055	12,898	16,152	15,058	9,485	87,188	1,289,506	1,274,595	5,476
Buildings, industrial	3,036	3,062	236	1,927	1,377	10,763	20,401	319,425	521,500	415
Buildings, commercial	1,860	52,865	1,421	5,325	10,171	1,805	73,447	981,930	1,616,503	6,364
Bridges, private	.....	.....	.....	1,721	276	.....	1,997	20,083	37,300	.....
Unclassified, private	420	968	50	251	4,177	435	6,301	389,400	339,209	1,325
Total private	5,316	56,895	1,707	9,224	16,001	13,003	102,146	1,710,838	2,514,512	8,104
November total, 4 weeks	**12,856**	**82,950**	**14,605**	**25,376**	**31,059**	**22,488**	**189,334**	.....	.....	**13,580**
October, 1930, 5 weeks	19,166	81,090	25,594	52,502	33,712	30,874	242,938	.....	.....	15,673
November, 1929, 4 weeks	13,808	108,534	17,310	41,781	29,699	26,536	237,668	.....	.....	8,853
Eleven months, 1930	255,070	1,217,087	247,554	509,631	457,300	313,702	.....	3,000,344	.....	175,590
Eleven months, 1929	220,985	1,612,577	323,129	726,443	548,571	357,402	.....	.....	3,789,107	175,678

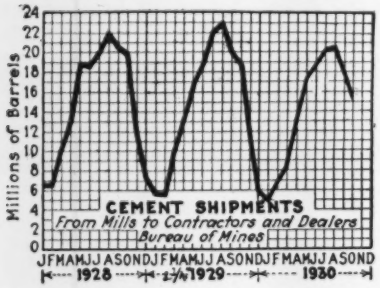


CONTRACTS AWARDED, SHOWING TREND BY CLASSES AND SECTIONS


CEMENT IMPORTS AND EXPORTS
Bureau of Foreign and Domestic Commerce
Thousands of Barrels
Imports
Exports
J F M A M J J A S O N D J F M A M J J A S O N D J F M A M J J A S O N D
1928
1929
1930

of 23,000 bbl. a month, most of it for Massachusetts. During the month the price dropped 5c. per barrel to $2.35 at Boston. Mill changes were declines of 3c. per barrel to $1.67 and $1.87 at North Birmingham and Norfolk respectively, and 8c. to $1.67 at Ironton, Ohio.

Lumber—Whether or not lumber prices will be higher in the first quarter of 1931 depends largely on how the industry manages its reserve stocks. Supply of sawed lumber is close to 3,600,000,000 ft.b.m., against stocks of


Millions of Barrels
CEMENT SHIPMENTS
From Mills to Contractors and Dealers
Bureau of Mines
J F M A M J J A S O N D J F M A M J J A S O N D J F M A M J J A S O N D
1928
1929
1930

3,100,000,000 ft. a year ago, an increase of 16 per cent. Intercoastal steamship lines announce a freight rise effective in January, 1931. The new rate will be $10.50 per 1,000 ft. for contract and $12.50 for non-contract cargoes, a rise of 50c. As a result longleaf 3x12s are already up $3 per 1,000 ft. at job site New York. Price cutting and forced production have about ceased in the Northwest fir regions, and the same will probably be true later at mills in other sections. Dealers in Kansas City cut fir prices 25c. per 1,000 ft. to $34.25, though mill quotations remained firm. Northern hardwood as well as softwood mills continue to sell more than they produce; this is true also of mills in the Pacific Northwest. In the southern, western, California and North Carolina pine areas the cut exceeds the demand. Dealers are unanimous that December will be an extremely dull month.

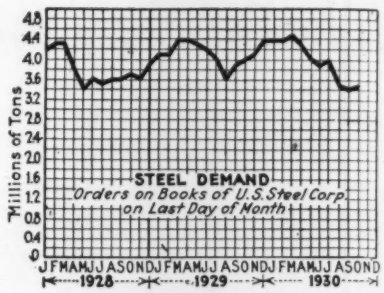
MOVEMENTS OF PRINCIPAL MATERIALS IN TEN MONTHS 1929-30

	1930	1929	Per Cent Change
Steel ingot prod...	35,410,283	47,888,156	—26.0
Unfilled orders....	3,481,763	4,086,000	—14.7
Fabricated structural steel sales, 9 mos.....	2,272,000	2,768,150	—18.0
Commercial castings, orders.....	788,651	1,151,859	—31.6
Fabricated plate, orders.....	339,848	447,235	—24.2
Malleable castings:			
Production.....	457,291	732,368	—37.6
Shipments.....	466,257	723,974	—35.6
Orders.....	421,595	702,258	—40.0
Terra cotta; orders	67,493	103,059	—35.0
Cement, bbl.;			
Production.....	141,327,000	144,930,000	—20.8
Shipments.....	144,272,000	152,264,000	— 5.2
Stocks on Oct. 31	20,699,000	15,381,000	+34.6
Lumber, softwood, M. ft. b.m.			
Production.....	11,736,168	14,890,417	—21.0
Shipments.....	11,364,575	14,485,395	—22.0
Orders.....	10,997,042	14,290,756	—23.0
Unfilled orders, Nov. 15.....	686,503	978,570	—29.9
Stocks, Nov. 15..	3,578,058	3,123,928	+44.9
Brick.....	No figures since August, 1930.		

Tile—Quotations announced by Chicago dealers in the first week of November have not held. Prices are down 2c. per block on most sizes, as there is no demand.

Sewer pipe dropped last month in Dallas and rose in Boston, Cincinnati, Kansas City.

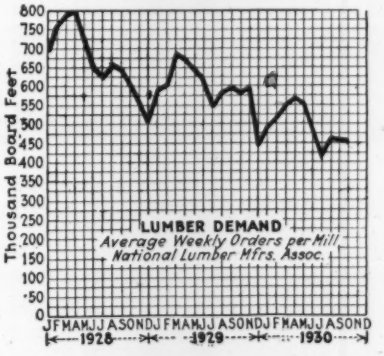
Lime—Hydrated common declined $1


Millions of Tons
STEEL DEMAND
Orders on Books of U.S. Steel Corp.
on Last Day of Month
J F M A M J J A S O N D J F M A M J J A S O N D J F M A M J J A S O N D
1928
1929
1930

per ton, to $14 in Boston; $2, to $14, in Cleveland; and $2.30, to $10.70, in Cincinnati. There are now only 239 plants, compared with 260 in 1927.

Brick—Market quiet, the only price changes being declines of $1 in Boston and $1.50 in Cincinnati, and an advance of $1 in Dallas. Competition has been keen among brickyards in the New York-New Jersey district, with no price reductions, although shipment information is difficult to obtain.

Paving Stone and Wood Block—Few changes during the year, except in November, when Chicago dealers reduced wood blocks 10c. per square yard to $2. New York granite dealers expect no early price changes, but have asked for a freight rate reduction of 3c. per 100 lb. to 12½@17c. on rough granite shipped in from New England over the New York, New Haven & Hartford Railroad.


Thousand Board Feet
LUMBER DEMAND
Average Weekly Orders per Mill
National Lumber Mfrs. Assoc.
J F M A M J J A S O N D J F M A M J J A S O N D J F M A M J J A S O N D
1928
1929
1930

Railway Ties—Fir ties are down 2c. in the San Francisco market, price of 8x8 ft. by 6 in. being 66c. each.

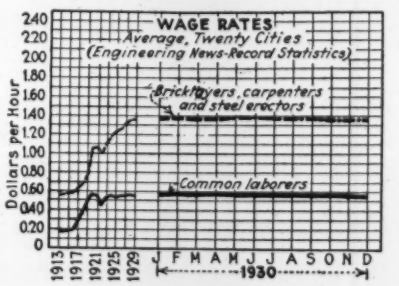
Steel—Producers are said to be preparing to ask higher prices for plain materials next quarter. Price cutting has ceased in heavy hot-rolled stock. When copper was increased 2½c. per pound to 12c., buying stopped; but steel stocks are light. When business improves at mills, heavy melting scrap is always in demand; hence the facts that scrap buy-

CURRENT BUILDING AND CONSTRUCTION TRADES WAGE RATES PER HOUR

Advances since last month are indicated by **heavy type**, declines by *italics*

Cities	Bricklayers	Carpenters	Hoisting Engineers	Hod Carriers	Pile Drivers	Structural Iron Workers	Common Labor*
Atlanta.....	$1.25@1.40	$0.60@.70	$0.60@1.00	$0.50	.....	$0.75@1.25	$0.25@.35
Baltimore...	1.75	1.00@1.10	1.00@1.37½	1.00	$0.65	1.00@1.25	.30
Birmingham.	1.50	1.00	1.25	.50	.....	1.25	.20@.35
Boston.....	1.50	1.37½	1.37½	.85	1.27½	1.37½	.45@.80
Cincinnati...	1.62½	1.40	1.40	1.00	1.40	1.40	.40@.60
Chicago.....	1.70	1.62½	1.62½	.97½	1.62½	1.62½	.97½
Cleveland...	1.62½	1.37½	1.37½	.87½	1.10	1.50	.35@.60
Dallas.....	1.75	1.12½	1.25	.50@.75	1.25	1.37½	.35@.50
Denver.....	1.50@1.62½	1.25	1.25@1.37½	.87½@1.00	.....	1.25	.62½
Detroit.....	1.56½	1.00@1.25	1.00@1.10	.90	1.00@1.10	1.00@1.25	.50@.60
Kansas City.	1.50	1.31½	1.31½	.90	1.31½	1.31½	*.35@.60*
Los Angeles..	1.37½	1.00	1.00	.75	.87½	1.00	.50
Minneapolis.	1.30	.90	.90@1.00	.80	.....	1.00@1.25	.50@.65
New Orleans.	1.50	.90	1.25	.75	.80@1.00	1.25	.30@.40
New York...	1.92½	1.65	1.92½	1.03½	1.10@1.23½	1.92½	1.03½
Philadelphia.	1.75	1.50	1.02½	.70@1.12½	1.00	1.37½@1.50	.40@.50
Pittsburgh...	1.75	1.50	1.50@1.56½	1.12½	.....	1.50	.40@.80
St. Louis....	1.75	1.50	1.50@1.75	1.15@1.25	1.25	1.75	.40@.87½
San Francisco	1.37½	1.12½	1.12½	.87½	1.12½	1.37½	.68¾
Seattle.....	1.50	1.12½	1.12½@1.25	1.00	1.12½	1.25	70
Average....	1.58	1.23	1.27½	*0.8753*	1.14	1.35	*0.5503*
Montreal....	1.25	.80	.75	.....	.90	1.00	.30@.35

*Minimum rates are non-union and for construction other than buildings.


WAGE RATES
Average, Twenty Cities
(Engineering News-Record Statistics)
Bricklayers, carpenters and steel erectors
Common laborers
Dollars per Hour
1913 1917 1921 1925 1929 J F M A M J J A S O N D
1930

ing lags and the Chicago market for No. 1 is down to $10 per ton (1921 level) indicate no early improvement in the steel business.

Expanded Metal Lath—Prices dropped in St. Louis and Dallas $2.50@$3.50 per 100 sq.yd. from November quotations. The reason was dealer competition, since the mill base on sheet-stock holds firmly.

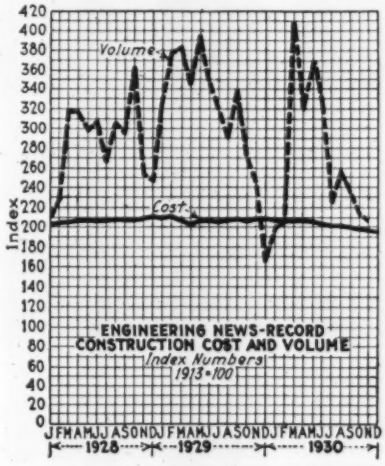
Wire nails are down 35c. per base keg at Pittsburgh mills.

Linseed Oil—Consumption amounted to 78,000,000 gal. this year, while production was only 76,000,000. In 1921 production and consumption were balanced at 81,000,000 gal., and that was an off year. The Minneapolis price is 10.7c., against 10.9c. a month ago.

Volume movements of the principal materials this year are shown in the accompanying tabulation.

Construction Cost and Volume Index Numbers

Costs dropped 0.09 per cent in October and 0.08 per cent in November. The current index is 196.86, or 6 per cent below that of a year ago. The Volume Index is 207, or only 1.9 per cent below that of October, compared with a drop of 10 per cent a year ago.


Volume
Cost
Index
ENGINEERING NEWS-RECORD
CONSTRUCTION COST AND VOLUME
Index Numbers
1913=100
J F M A M J J A S O N D J F M A M J J A S O N D J F M A M J J A S O N D
1928
1929
1930

E. N.-R. Cost		E. N.-R. Volume*	
Dec., 1930	**196.86**	**Nov., 1930**	**207**
Nov., 1930	198.54	Oct., 1930	211
Dec., 1929	209.46	Nov., 1929	245
Peak, June, 1920	273.80	1929 (average)	317
1929 (average)	207.02	1928 (average)	287
1913 (average)	100.00		
1929		1929	
January	209.40	January	325
February	210.40	February	378
March	207.78	March	382
April	203.40	April	332
May	205.15	May	395
June	205.65	June	347
July	204.77	July	320
August	205.91	August	290
September	207.57	September	340
October	206.32	October	273
November	208.46	November	245
December	209.46	December	166
1930		1930	
January	208.96	January	199
February	206.46	February	204
March	206.80	March	408
April	207.12	April	320
May	205.86	May	354
June	203.36	June	324
July	200.95	July	226
August	200.95	August	259
September	199.58	September	232
October	198.72	October	211
November	198.54	November	207
December	196.86		

*Corrected for price change since 1913.

Labor Notes

Unemployed workers number 3,400,000, according to the department of commerce. This is said to be a decrease of 100,000 since August, but is 900,000 more than reported in the census in April. Local conditions in the building trades are noted below.

Boston—Carpenters and painters rejected employers' proposal of a stagger system of three days.

Rochester — Monroe County has authorized all architects and engineers to embody a clause specifying the five-day week in all contracts for the county.

New York—The stone masons' union has made an agreement with contractors to provide rotation of employment, so that each member will obtain at least two or three days' work a week. Structural ironworkers' union has brought suit against the employing erectors to stop them from employing non-members and from inducing members to drop memberships. A victory for the union would mean institution of the closed shop in this trade, which has been open shop since 1905. The building industry division of the emergency employment committee will ask every member of the building industry, from the president of each firm down to the workman on the job, to contribute from 1 to 2 per cent of his weekly salary for eighteen weeks.

Newark — Carpenters propose stagger system providing for alternate groups to work three days one week and two the next. Westinghouse building program was tied up indefinitely by objection of unions to the use of concrete piles made by non-union laborers.

Dover (N. J.)—A street-repair program provides for all unemployed at 55c. per hour.

Washington (D. C.) — Sheet-metal contractors propose working seven hours instead of eight, in order to give work to one additional man for each seven now employed.

Columbus (Ohio) — To hold the present force of maintenance and repair men on state highways, the work week will be four days.

Chicago—Painters demand a two-day or a four-day week and six hours a day to relieve 14,000 unemployed men in this craft. Contractors reject proposal of trades to work three days per week, suggesting that the unions either compel members to force the regular scale or else release the contractors from signed agreements to pay the scale.

Lansing — Bricklayers walked out Nov. 11 on state building job, because union wage rate was cut. In future a minimum wage of 35c. per hour will be written into all Michigan state highway contracts.

Minneapolis — Definite improvement observed in lettings for small-housing construction.

St. Louis—Building trades unions have entered into an agreement with Sears, Roebuck & Co. in a plan to stimulate home building. Craftsmen are to obtain the customers, while Sears Roebuck is to finance the projects and supply materials. Union labor is to be used exclusively. Effective No. 28, electrical workers adopted a six-hour day, with additional employment of 160 men.

Denver—Half the building trades are employed. Open-shop jobs are becoming more frequent, with the scale breaking. In Manitou, Colo., work has been found for all unemployed men in the town, a sanitary sewer job helping to absorb the surplus.

Montreal—Wage rate of 50c. per hour for eight hours has been proposed instead of the present rate of 40c. for ten hours.

Wage Rates—The average skilled rate for December is $1.38¾ per hour, the same as for November, as against $1.37 in December, 1929. The common labor rate for December is 55.03c. per hour, compared with 55.87½c. in November and 56.53c. in December, 1929.

Capital Issues and Bond Sales

Corporation capital for production purposes issued in October totaled only 139 millions, compared with 424 a year ago and 456 and 480 in 1928 and 1927. The total for the ten months was 4,178 millions, compared with 4,536 last year. The value of private engineering construction contracts in the ten months amounted to 67 per cent of the securities total, compared with 78 per cent in 1929.

Public bond sales in October totaled 168 millions, compared with 118 in October, 1929, and 99 and 117 in 1928 and 1929. Sales for ten months aggregated 1,189 millions, or 14 per cent more than in 1929 and 12 per cent more than in 1928.

Construction by U. S. Government Exceeds That of 1929

An increase in this year's outlay by the federal government for roads and other permanent improvements over the expenditures for 1929, when $352,436,000 was spent, is predicted by Leo Wolman in the chapter on "Federal Construction" of his survey entitled "Planning and Control of Public Works," which has been made public by the Committee on Recent Economic Changes.

Pending governmental projects named in the chapter on "Federal Construction" include those pertaining to the inland waterway system, irrigation, maintenance of channels at ocean ports, grants for state highways, the ten-year program for postoffices and federal buildings, the Lighthouse and Coast Guard services, roads through national parks and national forests and $15,000,000 worth of new hospitals for World War veterans.

Current Prices of Construction Materials

Price advances since last month are indicated by **heavy type**; declines by *italics*

Building Materials

PORTLAND CEMENT—Prices per barrel, for cement in cloth, *without charge for bags*, cash discount not deducted. Prices are delivered by truck to contractors, except those marked F.O.B., which are manufacturers'. For cement in paper bags add 15c. per bbl:

	Dec. 4, 1930	One Mo. Ago	One Yr. Ago
Atlanta	$3.00	$3.00	$2.35
Baltimore	2.60	2.60	2.40
Birmingham	2.60	2.60	2.40
Boston	*2.35*	2.40	2.15@2.25
Dallas	2.15	2.15	2.15
Denver	2.61	2.61	2.61
Jersey City	2.33		
Kansas City	*2.07*	2.60	2.65
Los Angeles	1.92	1.92	2.42
Montreal	2.20	2.20	1.70
New Orleans	*2.35*	2.60	2.65
New York	2.10	2.10	2.10
Philadelphia	2.10	2.10	2.20
St. Louis	2.15	2.15	2.20
San Francisco	2.64	2.64	2.41
Seattle	2.25	2.25	2.70
(F.O.B.)			
Cedar Rapids	2.23	2.23	2.04
Chicago	1.95	1.95	1.85
Cincinnati	2.14	2.14	1.92
Cleveland	2.04	2.04	1.94
Davenport	2.14	2.14	2.04
Detroit	1.95	1.95	1.95
Duluth	2.04	2.04	1.84
Indianapolis	1.99	1.99	1.89
Milwaukee	2.10	2.10	2.00
Minneapolis	2.27	2.27	2.02
Peoria	2.12	2.12	2.02
Pittsburgh	1.95	1.95	1.85
St. Paul	2.27	2.27	2.02
Toledo	2.10	2.10	2.03

Current mill-prices per barrel, in carloads, without bags, f.o.b.:

Alpena, Mich	$1.65	Limedale, Ind	$1.70
Buffington, Ind	1.70	Mason City, Ia	1.85
Clinchfield, Ga	2.10	Norfolk, Va	*1.87*
Hannibal, Mo	1.80	Northampton, Pa	1.75
Houston, Tex	1.95	North Birmingham, Ala	*1.67*
Hudson, N. Y	1.85	Richard City, Tenn	2.05
Ironton, Ohio	*1.67*	Steelton, Minn	1.85
Iola, Kan	1.85	Universal, Pa	1.70
La Salle, Ill	1.80	Wyandotte, Mich	1.70

SAND AND GRAVEL—Per ton, delivered by dealers. Weight of sand per cu.yd., 1½ tons; gravel, 1½ tons, unless otherwise specified in pounds:

	Gravel		Sand
	1½ In.	¾ In.	
Atlanta	$3.25	$3.25	$2.50
Baltmore	*2.35*	*2.55*	**2.08**
Birmingham, per cu.yd., 2,600 lb	3.50	3.50	3.00
Boston	1.75	1.75	1.15
Chicago, per cu.yd	2.00	2.00	2.00
Cincinnati	1.75	1.75	1.50
Cleveland, per cu.yd., 3,000 lb	2.60	2.60	2.50
Dallas, per cu.yd., 2,750 lb	3.00	3.00	2.50
Denver, per cu.yd., 2,700 lb	1.95	1.95	1.35
Detroit	2.50	1.85	1.65
Kansas City	**1.75**	**1.75**	**1.75**
Los Angeles	1.50	1.50	1.00
Minneapolis, per cu.yd., 2,800 lb	2.40	2.40	1.10
Montreal	1.25	1.25	1.25
New Orleans, per cu.yd., 2,700 lb	*2.95*	*2.95*	*1.80*
New York, per cu.yd	3.40	3.40	2.15
Philadelphia	2.30@3.15	2.30@3.15	1.50@2.31
Pittsburgh	1.55	1.55	1.75
St. Louis	1.55	1.40	1.00@1.20
San Francisco	1.75	1.75	1.75
Seattle, per cu.yd., 3,200 lb	1.75	1.75	1.75

Note: New York gravel weighs 2,800@3,000 lb. and sand, 2,700 lb. per cu.yd.

CRUSHED STONE—Per ton, delivered by dealers. Weight per cu.yd., 1½ tons, unless otherwise specified in pounds:

	1½ In.	¾ In
Atlanta	$3.25	$3.25
Baltimore	2.60	2.80
Birmingham, limestone, per cu.yd	3.00	3.25
Boston	2.00	2.00
Chicago, limestone, per cu.yd., 2,500 lb	2.00	2.00
Cincinnati	2.25	2.25
Cleveland	2.60	2.60
Dallas, per cu.yd., 2,500 lb	3.25	3.25
Denver, granite, per cu.yd., 2,700 lb	2.50	2.50
Detroit, limestone	2.25	2.25
Kansas City	**1.90**	**1.90**
Los Angeles	1.40	1.40
Minneapolis, limestone, per cu.yd., 2,600 lb	2.40	2.40
Montreal	1.90	2.10
New York, limestone, per cu.yd	3.40	3.40
Philadelphia, limestone	2.30@3.15	2.30@3.15
Pittsburgh	2.75	2.75
St. Louis	*1.40*@1.60	*1.40*@1.60
San Francisco, trap rock	1.65	1.65
Seattle, per cu.yd., 2,700 lb	3.00	3.00

CRUSHED SLAG—Manufacturers' quotation on crushed slag in carloads, per net ton, at plant:

	1½-In.	¾-In.	Roofing	Sand
Birmingham, Ala	$0.90	$1.15	$2.05	$0.55
Buffalo District	1.25	1.35	2.25	1.25
Cleveland, Ohio	1.10	1.10		1.30
Western Pennsylvania	1.25	1.25	2.00	1.25
Toledo, Ohio	1.25	1.25	1.50	1.25
Youngstown District	1.25	1.35	2.00	1.25

HOLLOW TILE—Building tile per block, delivered by dealers to contractor in lots of 2,000 pieces or over:

	4x12x12	6x12x12	8x12x12	10x12x12	12x12x12
Atlanta	$0.1*	$0.18	$0.24	$0.30	$0.36
Baltimore	.105	.....	.20	.....	.26
Birmingham	.09	.127	.174	.218	.261
Boston	.08	.113	*.15*	.21	*.25*
Chicago	*.064*	*.088*	*.12*	*.1548*	*.172*
Cincinnati	.06815	.09485	.129	.165	.184
Cleveland	.064	.088	.128	.171	.19
Dallas	**.103**	**.136**	**.194**	.251	.306
Denver	.0975	.135	.175	.2125	.25
Detroit	.098	135	.184	.24	.265
Kansas City	.0525	077	.184	.24	.265
Los Angeles	.085	.122	.175	.232	.285
Minneapolis	.0611	.081	.10605	.1302	.1737
Montreal	.12*	.....	.22†	.....	.....
New Orleans	.068	.093	.13	.176	.212
New York	.0864	.1296	.162	.....	.....
Perth Amboy, N. J. (f.o.b.)	.....	.....	.....	.2388	.2956
Philadelphia	.105	.14	.215	.28	.34
Pittsburgh	.056	.078	.1175	.14	.1726
St. Louis	.078	.104	.145	.18	.215
San Francisco	.108	.156	.255	.....	.....
Seattle	.085	.115	.18	.....	.....

*4x4x12. †8x8x12.

BRICK—Prices delivered by dealers per thousand, are as follows:

		Paving F.O.B.	
	Common	3x8¼x4-In.	3¼x8¼x4-In
Atlanta	$16.25	$36.00*	$42.00†
Baltimore	13.00	40.00	46.00
Birmingham	13.50	26.00*	31.00†
Boston	*15.00*	43.00	47.00
Chicago	12.00	42.00	45.00
Cincinnati	*16.00*	*35.00*	*37.00*
Cleveland	12@14	33.00	36.00
Dallas	**14.50**	29.50*	.....
Denver	11.00	.....	.....
Detroit	15.50	33.50	36.50
Kansas City	14.50	.....	.....
Los Angeles	8.00	.....	.....
Minneapolis	12.75	.....	.....
Montreal	20.00	.....	.....
New Orleans	12.00	38.00*	45.00
New York	13.00	45.00	50.00
Philadelphia	16.00	40.00	46.00
Pittsburgh	16.00	40.50	45.00
St. Louis	12.00	38.00	38.00
San Francisco	12.00	45.00*	.....
Seattle	14.00	48.50**	61.00††

*2¼x8¼x4 in. †3x8¼x4. **2¼x8¼x4. ††3¼x8¼x4.

LIME—Prices delivered by dealers to job:

	Hydrated, per Ton		Lump, per Barrel	
	Finishing	Common	Finishing	Common
Atlanta	$23.00	$15.50	.....	.....
Baltimore	22.00	14.00	$2.55†	.....
Birmingham	22.00	16.00	3.00†	$2.00†
Boston	22.00	*14.00*	4.00*	*3.10**
Chicago	17.00	14.50	15.00‡	15.00‡
Cincinnati	*13.05*	*10.70*	.....	.....
Cleveland	*14.00*	*12.00*	2.50†	2.50†
Dallas	20.00	.....	2.35†	1.80†
Denver	32.00	23.75	3.80*	3.00*
Detroit	18.00	14.80	2.20†	2.00†
Kansas City	22.00	*12.50*	**3.00**†	2.50†
Los Angeles	18.90	16.00	2.85†	14.00‡
Minneapolis	25.50	**21.00**	.....	1.70†
Montreal	19.75	.....	.....	15.00‡
New Orleans	25.00	15.50	2.65†	1.95†
New York	21.00	13.00	4.10*	3.15*
Philadelphia	22.00	15.00	.....	.....
Pittsburgh	20.00	15.00	4.25*	.....
St. Louis	24.00	18.00	2.75†	15.00‡
San Francisco	20.00	20.00	.....	1.85†
Seattle, paper sacks	35.00	24.00	.....	2.80†

*Per 280-lb. bbl. (net). †Per 180-lb. (net). ‡Per ton.

CONCRETE BLOCKS—Manufacturers' quotations on standard, 8x8x16-in., hollow, delivered to job, each:

Boston	$0.18@$0.20	Minneapolis	$0.11
Brooklyn and Queens	.12@ .14	New Orleans	.20
Cleveland	.16@ .17	Philadelphia	.18@.25
Denver	.22	Pittsburgh	.20
Detroit	.15	St. Louis	.17
Kansas City	.18		

SLATE—Roofing, f.o.b., quarry, Bangor, Pa., net, per square:

No. 1 Clear	$9.00@$14.00
No. 1 Ribbon	7.50@ 10.25
Medium Clear	8.00@ 10.50

Road and Paving Materials

PAVING STONE—Carloads or cargo lots of granite blocks, 4x8x4-in., dressed, f.o.b.:

Atlanta	$3.00 per sq.yd.
Baltimore	3.00 per sq.yd.
Boston	135.00 per M.
Chicago, 5 in.	3.25@3.90 per sq.yd.
Cincinnati	110.00 per M.
Cleveland	115@120 per M.
Detroit, 5 in.	3.00 per sq.yd.
Kansas City	3.00 per sq.yd.
Minneapolis, 4½x8x5 in.	2.80 per sq.yd.
Montreal	104.75 per M.
New Orleans	2.80 per sq.yd.
New York, 5 in., Grade 1, 30 blocks per sq.yd	150.00 per M.
Philadelphia	125.00 per M.
St. Louis, 4x5x8 to 12 in.	3.50 per sq.yd.

Current Prices of Construction Materials

Road and Paving Materials—Continued

WOOD-BLOCK PAVING—Prices, f.o.b., in carloads:

	Size of Block	Treatment	Per Sq.Yd.
Atlanta	3½	16	$2.25
Boston	3½	16	2.25
Chicago	3½	12	*2.00*
Cincinnati	3½	16	2.35
Kansas City	3½	16	2.75
Minneapolis	3½	16	2.75
Montreal	4	16	4.50
New Orleans	3½	16	2.40
New York	3½	16	2.50
St. Louis	3½	16	2.40

FLAGGING—Alongside dock, New York: Manhattan and Bronx, 4 ft. wide, 24c. per sq.ft.; Queens, 5 ft. wide, 26c. per sq.ft.

CURBING—*New York*: Bluestone, f.o.b. barge, 5x16 in., rough, 90c. per lin.ft., cutting charges extra. *Birmingham*: Limestone, 5x18-in., f.o.b., $1.05 per lin.ft. *St. Louis*: Class "B" straight, 5x16-in., f.o.b., $1.00 per lin.ft.; roundings, $1.35 per lin.ft.

ASPHALT—Manufacturers' quotations per ton in packages (350-lb. bbls or 425-lb. drums); also in tank-car lots, f.o.b. points listed:

	Package	Tank-car
Atlanta (Mexican)	$20.40	$17.40
Baltimore (Standard Oil, f.o.b. refinery)	21.75	17.75
Birmingham (Mexican)	27.00	23.00
Boston (Mexican)	23.00	18.00
Chicago (Texas)	23.50	19.30
Cincinnati (Kentucky Rock)	.....	12.30
Cleveland	24.00	20.00
Dallas (Texas)	24.40	*20.00*
Denver (California)	35.00	.....
Detroit (Mexican) (Texas)	19.72	14.87
Kansas City, Mo. (Texas)	**30.00**	**25.00**
Los Angeles ("D" Grade, Calif., f.o.b., El Segundo)	18.00	12.00
Maurer, N. J. (Bermudez)	30.00	.....
Maurer, N. J. (Trinidad)	25.00	.....
Minneapolis, (Stanolind, f.o.b., Twin Cities)	**23.10**	19.10
Montreal (Imperial)	28.00	21.50
New Orleans (Texas)	24.00	21.00
New York (Texas)	22.50	18.50
Philadelphia (Mexican)	18.00	15.00
Pittsburgh (Standard Oil)	24@26	14@18
St. Louis (Venezuelan)	22.50	18.50
San Francisco, (f.o.b. refinery, Oleum, Calif.)	18.00	12.00
Seattle (Standard Oil)	22.40	18.00

ROAD OILS—Manufacturers' quotations, f.o.b., in tank cars, 8,000 gal. minimum, per gal.:

Birmingham, 40@50% asphalt	$0.0525
Birmingham, 50@60% asphalt	.0525
Dallas, 40@50% asphalt	.06
Dallas, 50@60% asphalt	.06
New York, 40@50% asphalt, (at terminal)	.05
New York, 50@60% asphalt, (at terminal)	.05
St. Louis, 40@50% asphalt	.04
St. Louis, 50@60% asphalt	.04

Iron and Steel

PIG IRON—Producers' quotations, per gross ton, f.o.b.:

Birmingham, No. 2 fdry., silicon 1.75@2.25	$14.00
Pittsburgh, basic, incl. freight ($1.76) from Valley	19.63@20.13

STRUCTURAL STEEL—Manufacturers' and dealers' quotations per 100 lb.

	Shapes, 3 to 15-In.	Plates, ¼-In.
Birmingham, large mill lots, f.o.b.	$2.15	$2.15
Chicago, warehouse, delivered	3.00	3.00
Cleveland, warehouse, delivered	3.00	3.00
Dallas, warehouse, delivered	**3.90**	4.00
New York, warehouse, delivered, 400 to 3,999 lb.	3.10	3.10
Pittsburgh, large mill lots, f.o.b.	1.60	1.60
St. Louis, warehouse, delivered	3.25	3.25
San Francisco, warehouse, delivered	3.40	3.40

BARS, CONCRETE REINFORCING—Manufacturers' and dealers' quotations on bars rolled from billets, per 100 lb. for ½-in.:

Birmingham, large mill lots, f.o.b.	$2.15
Chicago warehouse, delivered	2.15@3.00
Cleveland, warehouse, delivered	2.25@2.44
Dallas, warehouse, delivered	*2.50*
New York, warehouse, delivered, over 5 tons	2.70
Pittsburgh, large mill lots, stock lengths, f.o.b.	1.70
St. Louis, warehouse, delivered	3.15
San Francisco, warehouse, delivered	2.50

EXPANDED METAL LATH—Per 100 sq.yd., painted, delivered to job, in less-than-carload lots:

Lb. per Sq.Yd.	New York	Birmingham	Chicago	St. Louis	Dallas	San Francisco
2.2	$18.50	$22.00	$10.10	*$18.00*@20.50	*$18.00*	$21.50
2.5	19.50	23.00	10.90	*19.00*@21.50	*19.50*	22.50
3.0	21.00	25.00	12.25	*20.50*@23.00	.....	25.00
3.4	22.00	26.50	13.10	*21.50*@24.00	*24.00*	27.00

WIRE REINFORCEMENT FOR CONCRETE—Plain, 4 in. x 4 in. mesh; manufacturers' quotations per 100 sq.ft. in carloads at mills; dealers' delivered in lots of 10,000 sq.ft. or over:

Style Number	Weight in Pounds per 100 sq.ft.	Pittsburgh Mill	Chicago District Mill	Del. From Warehouse: New York	St. Louis	Dallas	San Francisco
032	22	$0.99	$1.01	$1.39	$1.30	$1.63	$1.22*
049	28	1.26	1.29	1.76	1.70	2.00	1.55*
068	35	1.54	1.58	2.18	2.10	2.25	1.91*
093	45	1.98	2.03	2.79	2.65	2.86	2.46*
126	57	2.45	2.51	3.45	3.30	3.52	3.03*
153	68	2.92	2.99	4.13	4.00	4.20	.....
180	78	3.35	3.43	4.73	4.60	4.80	.....

* F.o.b. warehouse.

STEEL SHEETS—Manufacturers' and dealers' quotations per 100 lb. base:

	Blue Annealed No. 10*	Black No. 24	Galvanized No. 24
Chicago, warehouse, delivered	$3.35†	$3.80†	$4.35†
Cleveland, warehouse, delivered	3.00	3.60	*4.20*
New York, warehouse, delivered	3.40†	3.90	4.25
Pittsburgh, large mill lots, f.o.b.	1.90@2.00	2.35@2.45	*2.90*@3.00
St. Louis, warehouse, delivered	3.45	4.05	4.60
San Francisco, warehouse, delivered	3.80	4.35	4.85

*Light plates. †400 lb. to 3,999 lb.

WIRE ROPE—Discounts from manufacturers' list price on regular grades of bright and galvanized, Eastern Territory, New York, and East of Missouri River.

	Base
Cast steel round strand rope	20%
Galvanized iron rigging and guy rope (add to list)	12½%
Galvanized steel rigging and guy rope	7½%
Plow steel round strand rope	35%
Round strand iron and iron tiller	5%
"Special Steel" and extra strong cast steel, round strand rope	27½%

Discount 5 points less than discount for Eastern territory: California, Oregon, Nevada, Washington, Wyoming, New Mexico, Colorado, North Dakota, Nebraska, Kansas, Oklahoma and Texas. Discount 10 points less than discount for Eastern territory: Arizona, Montana, Idaho and Utah.

RIVETS—Manufacturers' and dealers' quotations on structural rivets, round head, ½-in., full kegs, per 100 lb.:

Chicago, warehouse, delivered	$4.00
Dallas, warehouse, delivered	**5.80**
Denver	4.80
New York, warehouse, delivered	4.50*
Pittsburgh, large mill lots, f.o.b.	2.75
St. Louis, warehouse, delivered	4.15
San Francisco, warehouse, delivered	5.50
Seattle, warehouse, delivered	4.00

*This price is for full kegs; broken kegs are $6.00 per 100 lb.

STEEL SHEETPILING—The manufacturers' base price, f.o.b., Pittsburgh, for large mill lots is $2.25 per 100 lb.

TERNE PLATE—I C, 8-lb. coating, 20x28-in., f.o.b., Pittsburgh mill:

Per package	$10.30

SHIP SPIKES—Per 100 lb., black, from dealers' warehouse stocks; galvanized are about $1.75 per 100 lb. higher:

	½-In.	⅝-In.	¾-In.
San Francisco	$5.55	$5.10	$4.95
Seattle	7.75	5.65	5.50

Pittsburgh mill base in lots of 200 kegs or more, $3.00 per 100 lb.

WIRE NAILS—Per 100 lb. keg, base, delivered from warehouse stocks; also Pittsburgh mill base:

Pittsburgh Mill	Birmingham	Chicago	St. Louis	Dallas	San Francisco	Montreal
$1.95@$2.00	$3.30	$3.30	$2.50	*$3.50*	$3.25	$4.95

SCRAP—The prices following are, f.o.b., per ton, paid by dealers:

	New York Per Gross Ton	Chicago Per Gross Ton	Detroit Per Gross Ton
No. 1 railroad wrought	$8.75	*$9.75*@*$10.25*	.....
Stove plate	*5.00*	8.50@ 9.00	*$6.00**
No. 1 machinery cast	*8.00*	*11.25*@ *11.75*	*9.00**
Machine shop turnings	*3.50*	5.00@ 5.50	*4.25*
Cast borings	*4.00*	*4.50*@ *5.00*	**6.00**
Railroad malleable	*9.50*	13.00@ 13.50	*10.00*
Re-rolling rails	9.25	*13.00*@ *13.50*	*10.00*
Re-laying rails, 56@60 lb.	23.00	23.00@ 25.00	.....
Heavy melting steel, No. 1	*7.50*	*10.00*@ *10.50*	*10.25*
Iron and steel pipe	7.25	*6.00*@ *6.50*	.....

*Net ton.

FREIGHT RATES—The following freight rates per 100 lb., effective May 20, 1930, apply on finished steel products in the Pittsburgh district, including plates, structural shapes, merchant-steel bars, pipe fittings, plain and galvanized wire nails, rivets, spikes, bolts, flat sheets (except planished), chains, etc.:

Atlanta	$0.58*	Detroit	$0.265†
Baltimore	.27†	Kansas City	.695†
Birmingham	.58*	New Orleans	.67*
Boston	.40†	New York	.33†
Buffalo	.235†	Pacific Coast (all rail)	1.15‡
Chicago	.34†	Philadelphia	.29†
Cincinnati	.265†	St. Louis	.39†
Cleveland	.185†	St. Paul	.60*
Denver	1.15‡		

*36,000 lb. †40,000 lb. ‡60,000 lb.

Railway Materials and Supplies

STEEL RAILS—Manufacturers' quotations per gross ton, f.o.b., for large mill lots:

	Pittsburgh	Birmingham	Chicago
Standard openhearth rails	$43.00	$43.00	$43.00
Light rails, 25 to 45 lb.	34.00	34@36	34@36
Re-rolled rails	24@28	34@36	34@36

RAILWAY TIES—For fair-sized orders, f.o.b., the following prices per tie hold:

		6 In. x 8 In. by 8 Ft.	7 In. x 9 In. by 8½ Ft.
New York	Long-leaf sap pine, untreated	$1.05	$1.20
	Creosoted—prices on application.		
Birmingham	White oak, creosoted	1.52	1.75
	Southern pine, creosoted	1.25	1.60
Chicago	White oak, untreated	1.35	1.70
	Oak, empty cell, creosoted	1.75	2.30
	Oak, zinc treated	1.55	2.05
	Southern pine, creosoted	1.45	1.90
St. Louis	White oak, untreated	1.00	1.50
	Red oak, creosoted	1.30	1.90
	Sap pine or cypress, untreated	.65	1.20
San Francisco	Douglas fir, green, untreated	*.66*	*.95*
	Douglas fir, empty cell, creosoted	*1.42*	*2.53*
Montreal	Birch or maple, untreated	.75@1.25	.75@1.25
	Birch or maple, creosoted	1.20@1.30	1.50@1.60

Current Prices of Construction Materials

Railway Supplies—Continued

TRACK SUPPLIES—Manufacturers' and dealers' quotations per 100 lb. f.o.b., Pittsburgh mill, for large mill lots, together with warehouse prices at other places named:

	Pittsburgh	Chicago	Birmingham	St. Louis	San Francisco
Standard spikes, ⅝-in. and larger	$2.80	$3.55	$3.45	$3.65@$3.95	$4.10
Track bolts	3.80	4.55	5.85	4.65@ 5.00	5.10
Standard section angle bars, splice bars or fish plates	2.75	3.40	3.75	.....	.....

Tie plates: Price at Pittsburgh mill, $2.07½ per 100 lb.

Pipe

WROUGHT-STEEL PIPE—Discounts from manufacturers' and dealers' standard lists:

	1 to 3-In. Butt Weld		3½ to 6-In. Lap Weld	
	Black	Galvanized	Black	Galvanized
Chicago, warehouse, delivered	57.3%	44.8%	53.9%	41.4%
Cleveland, warehouse, delivered	53.3%	42.3%	50.8%	37.8%
New York, warehouse, delivered	56.14%	43.6%	52.72%	40.18%
Pittsburgh, large mill lots, f.o.b.	64%	52.5%	61%	49.5%
St. Louis, warehouse, delivered	51%	38%	48%	35%

CAST-IRON PIPE—Prices of U. S. Pipe & Foundry Co., per net ton, for bell and spigot pipe, Class B and heavier, f.o.b., on regular lots of pipe:

	4-In.	6-In. and Over
Birmingham mill	$40.00@$41.00	$37.00@$38.00
Burlington (N. J.) mill	40.00	37.00
Chicago	48.20@ 49.20	45.20@ 46.20
New York	42.90	39.90
Pittsburgh	48.80@ 49.80	45.80@ 46.80
St. Louis	46.80@ 47.80	43.80@ 44.80
San Francisco	50.00@ 51.00	47.00@ 48.00

Gas pipe and Class A, $3.00 per ton extra.

SEWER PIPE—Prices delivered, per foot, for standard pipe; 6, 8 and 12-in. are single strength and 18, 24, 30 and 36-in. are double strength:

	6-In.	8-In.	12-In.	18-In.	24-In.	30-In.	36-In
Atlanta	$0.15	$0.25	$0.82½	.....	.....	.....	.....
Baltimore	.10	.30	.58	.....	$1.93	.....	$6.50
Birmingham	.25	.40	.65	$1.50	2.75	$3.90	5.85
Boston	.18	.28	.55	1.35	**2.30**	**3.90**	6.50
Chicago	.18	.28	.54	1.25	2.25	4.75	6.00
Cincinnati	.135	.21	.405	**1.12½**	**2.025**	**3.672**	**5.74**
Cleveland	.189	.294	.567	1.35	2.43	4.824	7.38
Dallas	*.21*	*.325*	*.586*	*1.06*	*1.95*	3.68	5.00
Denver	.161	.23	.414	.816	1.44	.....	.....
Detroit	.18	.28	.6075	1.50	2.70	5.12	.....
Kansas City	.15	.29	**.52**	1.22	**1.90**	3.60	.....
Los Angeles	.21	.29	.52	1.186	2.03	3.39	5.09
Minneapolis	.16	.25	.50	1.15	1.85	3.49	4.97
Montreal	.36	.53	.78	1.48	2.75	4.20	.....
New Orleans	.18	.30	.54	1.02	1.95	.....	.....
New York	.17	.265	.52	1.30	2.34	4.47	6.86
Philadelphia	.117	.182	.351	1.05	1.89	3.60	5.6375
Pittsburgh	.0945	.147	.2385	.85	1.53	3.024	4.8175
St. Louis	.1645	.26	.468	1.092	1.872	3.65	4.80
San Francisco	.1925	.275	.495	1.155	1.98	3.30	4.95
Seattle	.22	.30	.54	1.26	2.16	3.50	5.50

CLAY DRAIN TILE—Prices delivered by dealers, per 1,000 lin.ft.:

Size, In.	New York	Birm'ham	St. Louis	Dallas	San Fran.	Seattle
4	$55.00	$56.00	$50.00	$63.00	$67.50	$60.00
6	112.00	112.00	85.00	100.00	112.50	112.00

Miscellaneous

LINSEED OIL—Raw oil, f.o.b., in 1- to 4-bbl. lots, per lb.:
New York.... *$0.102* Chicago.... *$0.10¼* Minneapolis... *$0.107*

WHITE AND RED LEAD—Base price per 100-lb. keg, f.o.b., New York: White, dry, $13.75; White, in oil, $13.75; Red, dry, $13.75; Red, in oil, $15.25.

CHEMICALS—Water, sewage treatment, road work, round lots in the New York market:

Sulphate of aluminum, in bags, per 100 lb	$1.40@$1.45
Sulphate of copper, in bbl., per 100 lb	*3.95@* 4.25
Soda ash, 58%, in bags, per 100 lb	1.32@ 1.35
Chlorine, cylinders, per lb	.04@ .06
Bleaching powder, in drums, f.o.b. works, per 100 lb	2.00@ 2.10
Calcium chloride, flaked, in drums, f.o.b. works, per ton	22.75

MANILA ROPE—The number of feet per pound for the various sizes is as follows: 5-in., 7-ft., 6-in.; 4½-in., 6-ft., 1-in.; ¾-in., 4-ft., 5-in.; 1-in., 3-ft., 8-in.; 1¼-in., 2-ft., 5-in.; 1½-in., 1-ft., 8-in. Following prices are quoted by dealers per pound for ¾-in. and larger:

Atlanta	$0.35	Kansas City	$0.25
Baltimore	.225	Los Angeles	.25
Birmingham	.26	Minneapolis	.19
Boston	*.21*	Montreal	.185
Chicago	.17	New Orleans	.25
Cincinnati	.21	New York	.205
Cleveland	.21	Philadelphia	.23
Dallas	**.26**	San Francisco	.193
Denver	.22	Seattle	.195
Detroit	.225	St. Louis	.205

BUILDING PAPER—Black, 50-lb., in carloads, per roll of 500 sq.ft., f.o.b., producing point $2.40

SLATERS FELT—In carloads, per roll, f.o.b., producing point $0.90

ROOFING MATERIALS—Price f.o.b., New York, delivered by dealers to contractors in carloads:

Asphalt felt, per 100 lb	$3.00
Tar felt, per 100 lb	3.00
Asphalt coating, per gal	.34½
Tar pitch, in 350 lb. barrels, per ton	28.00

PREPARED ROOFINGS—Prices delivered by dealers to contractors, in carloads, f.o.b. New York, per square:

Single shingles, slate finish, sufficient to cover 100 sq.ft.	$6.12
Strip shingles, 4 in 1, hexagonal shape, with Underwriters' label	6.00
Slate surfaced roofing in rolls weighing 85 to 90 lbs.	2.50

WINDOW GLASS—United inches 25, bracket size 6x8 to 10x15, single or double thickness, discount from jobbers' list (Sept. 15, 1928), at New York warehouses:
AA..... 83% A..... 86% B..... 88%

EXPLOSIVES—Manufacturers' quotations per pound for dynamite delivered in small lots, under 200 lb.:

	Gelatin 40%	Gelatin 60%		Gelatin 40%	Gelatin 60%
Atlanta	$0.22	$0.245	Los Angeles, f.o.b.†	$0.1875	$0.2225
Baltimore	.215	.2375	Minneapolis	*.20*	*.225*
Birmingham	.22	.245	Montreal	.20	.24
Boston	.225	.255	New Orleans	.195	.22
Chicago	.195*	.22*	New York	.255‡	.2775‡
Cincinnati	.22	.245	Philadelphia	.215	.24
Dallas	**.2125**	**.2475**	St. Louis	.215	.235
Denver, f.o.b.	.19	.2125	San Francisco	.155	.18
Kansas City, Mo.	.2025	.2225	Seattle	.1525	.175

*Quantities above 500 lb. but less than a ton. †San Fernando Arsenal. ‡Special gelatin in case lots.

Lumber

Prices Are Per Thousand Feet, Board Measure

New York—Timbers, No. 1 Common, rough, delivered in Manhattan to contractor at site of job, in 20 ft. lengths and under, per M. ft., b.m.:

	Long-leaf Yellow Pine	Douglas Fir
3x4 to 8x8	**$52.50**	$35.00
3x10 to 10x10	**65.00**	36.00
3x12 to 12x12	**73.00**	37.00
3x14 to 14x14	**85.00**	42.50

Chicago—Prices, f.o.b., in carloads, No. 1 Common, rough, per M. ft. b.m. For delivery to job from stock, in truckloads, add $10 per M. ft., b.m.:

	20 Ft. and Under Long-Leaf Yellow Pine	Up to 32 Ft. Douglas Fir
3x4 to 8x8	$41.50	$39.50
3x10 to 10x10	49.00	39.50
3x12 to 12x12	61.00	39.50
3x14 to 14x14	73.00	40.50

San Francisco—Douglas fir, No. 1 common, rough, at yards. For delivery to contractor at site of job, add $1.50 to $5 per M. ft., b.m.:

	10-16-18 and 20 Ft.	22 and 24 Ft.
3x3 and 4	$30.00	$32.00
3x6 and 8	30.00	32.00
3x10 and 12	30.00	32.00
3x14	33.00	34.00

Other Cities—Delivered by dealers, No. 1 Common, rough, per M. ft., b.m.:

	8x8-In. x 20 Ft. and Under				3x12 to 12x12-In. 20 Ft. and Under	
	Pine	Fir	Hemlock	Spruce	Pine	Fir
Atlanta	$55.00	.....	.....	.....	$65.00	.....
Baltimore	36.00	$50.00	**$53.75**	**$61.75**	75.00	$50.25
Birmingham	53.00	.....	.....	.....	56.50	.....
Boston	52.00	45.00	**47.50**	48.00	*68.00*	42.00
Cincinnati	42.50	55.00	.....	.....	52.50	52.50
Cleveland	*54.00*	58.00	.....	.....	58.00	62.00
Dallas	55.00	**57.50**	55.00	55.00	55.00	*50.00*
Denver	.....	50.00	47.50	47.50	.....	55.00
Detroit	53.00	51.00	.....	.....	67.00	51.00
Kansas City	*36.00*	*34.00*	.....	.....	*50.00*	*34.00*
Los Angeles	.....	**43.50**	.....	.....	.....	**45.50**
Minneapolis	.....	46.25	.....	.....	.....	46.25@47.75
Montreal	50.00	48.00	.....	.....	56.00	48.00
New Orleans	**44.00**	*40.00*	.....	45.00	**65.00**	**60.00**
Philadelphia	50.00	43.00	42.00	48.00	60.00	43.00
Pittsburgh	75.00	65.00	65.00	65.00	75.00	60@65
St. Louis	52.50	40.00	39.00	.....	60.00	41.00
Seattle	.....	19.00	.....	.....	.....	20.00

	1x10 In. x 16 Ft. and Under			2x10 In. x 16 Ft. T. & Gr.	
	Pine	Fir	Hemlock	Pine	Fir
Atlanta	$55.00	.....	.....	$40.00	.....
Baltimore	55.00	$44.50	$44.00	.....	.....
Birmingham	36.00	.....	.....	45.00	.....
Boston	**47.00**	40.00	**42.50**	48.00	*$44.00*
Cincinnati	45.00	47.50	.....	35.00	45.00
Cleveland	**65.00**	65.00	.....	*42.00*	*64.00*
Dallas	60.00	.....	.....	55.00	.....
Denver	.....	38.00	38.50	.....	44.00
Detroit	48.00	44.00	.....	48.50	46.50
Kansas City	46.00	33.25	.....	40.25	36.25
Los Angeles	.....	**40.50**	.....	.....	*48.50*
Minneapolis	65.00*	40.00	.....	45.00*	39.00
Montreal	56.00	.....	.....	.....	.....
New Orleans	*54.00*	*48.00*	.....	*40.00*	40.00
Philadelphia	52.00	43.00	41.00	55.00	44.00
Pittsburgh	75.00	55.00	55.00	65.00	65.00
St. Louis	44.00	42.00	41.00	45.00	43.00
Seattle	.....	18.00	.....	.....	19.00

*Northern P.ne, No. 2 Com.

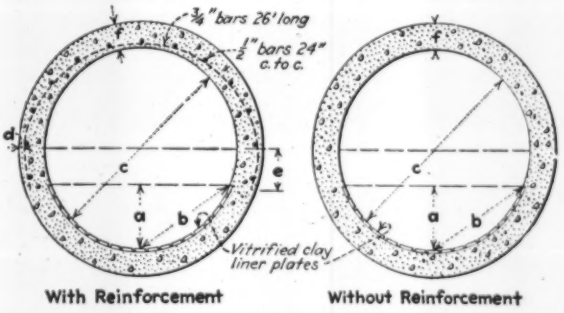
PILES—Prices of Nichols Bros., 90 West St., N.Y.C., per lineal foot, pine, with bark on, f.o.b., New York; delivered from barge, 1½ to 2c. per ft. additional:

Dimensions	Points	Length	Barge	Rail
12 in. at butt	6 in.	30 to 50 ft.	$0.14½	$0.18
12 in.—2 ft. from butt	6 in.	50 to 59 ft.	.19	.23
12 in.—2 ft. from butt	6 in.	60 to 69 ft.	.21½	.25
14 in.—2 ft. from butt	6 in.	50 to 69 ft.	.25½	.36
14 in.—2 ft. from butt	6 in.	70 to 79 ft.	.27½	.31
14 in.—2 ft. from butt	5 in.	80 to 85 ft.	.33	.41
14 in.—2 ft. from butt	5 in.	85 to 89 ft.	.38	.45

Unit Prices From Current Construction Bids

Circular Concrete Sewer for Columbus, Ohio

CONTRACT 1, Sec. 1, of the Olentangy-Scioto intercepting sewer project for Columbus, Ohio, was awarded in the latter part of February, 1930, and the unit prices were published on p. 545 of the March 27 issue. Contract 22, Sec. 5, joining contract 1 on the south, was awarded in September, 1930, and the unit prices are given herewith. Bids were asked on two proposals: A, for 2,125 lin.ft. 11¾-ft. (inside diameter) circular concrete sewer and 2,814 ft. 10¼-ft.; B, for 2,125 ft. 11¾-ft. and 2,060 ft. 10¼-ft. Both



TYPICAL TUNNEL SEWER SECTIONS

Dimensions	a	b	c	d	e	f
11¾ Ft.	3'9"	6'7½"	11'9"	2"	2'6"	18"
10¼ Ft.	3'6"	6'0"	10'3"	2"	2'6"	15"

proposals include construction of a special section across the main intersecting sewer, a short section of 10½x12-ft. rectangular sewer, and appurtenant work.

Tunnel excavation is the largest item in either proposal, amounting to 56 per cent of the low bid for A and 58 per cent of B. The contractor provides two air-compressing plants with capacity to maintain 10 lb. per square inch at either tunnel heading or at both. For these plants the engineer's estimate was $15,000 each; average of the six bids, $19,170. Proportion of cement to total aggregate and water is 1 bag to 6 cu.ft. to 6 gal. for tunnel, sewers and structures. Proportion of fine to coarse aggregate is determined by the engineer according to the water-cement-ratio method. Mixing time is three minutes. The two circular sections are to be constructed with or without reinforcement as follows: 45 ft. 11¾-ft. with, 2,063 without; 1,447 ft. 10¼-ft. with, 1,367 without. Cross-sections of both types are shown in the drawing. Estimated quantities per linear foot are:

	10¼ Ft.	11¾ Ft.
Excavation, cu.yd.	4.729	6.329
Concrete, cu.yd.	1.633	2.268
Reinf. bars, lb.	54.360	59.784
Liner plates, pieces	11¼	12¼

Six bids were received on the two proposals, and unit prices are given of the lowest two bidders, the average of the lowest three, and the engineer's estimate. Walter S. Raem, Pittsburgh, was awarded the contract on a bid of $597,300 for proposal A; second lowest bidder was P. W. Graham Contracting Co., Oliver Bldg., Cleveland. R. H. Simpson is chief engineer, department of public service, Columbus.

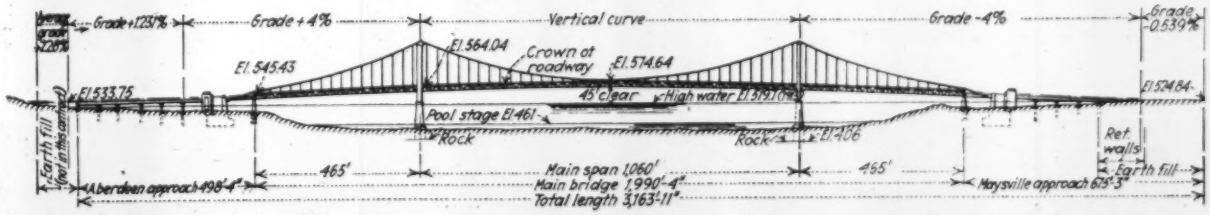
Items in Proposal A, Only	Quantity	A	B	Avg. 3 Lowest
2-a. tunnel excav.	27,000 cu.yd.	$8.38	$9.00	$9.06
4-a. tunnel concrete	9,500 cu.yd.	14.00	24.00	19.00
7-a. reinf. bars in tunnel	82,000 lb.	0.04	0.06	0.053
9-a. v. c. liner plates in tunnel	67,000 sq.ft.	0.20	0.20	0.23
12-a. grout pipes	1,850	0.50	0.25	0.58
13-a. grout	3,700 bbl.	3.00	3.50	4.17
14-a. alignment holes	150 lin.ft.	6.00	2.00	4.67
Items in Proposal B, Only				
2-b. tunnel excav.	23,500 cu.yd.	8.49	9.00	9.09
4-b. tunnel concrete	8,300 cu.yd.	14.00	24.00	9.00
7-b. reinf. bars in tunnel	50,000 lb.	0.04	0.06	0.053
9-b. v. c. liner plates in tunnel	57,200 sq.ft.	0.20	0.20	0.23
12-b. grout pipes	1,570	0.50	0.25	0.58
13-b. grout	3,200 bbl.	3.00	3.50	4.17
14-b. alignment holes	130 lin.ft.	6.00	2.00	4.67
Items Common to Proposals A and B				
Open trench excav.	16,500 cu.yd.	5.62	2.00	3.87
Conc. for sewers and structures	3,100 cu.yd.	21.25	20.00	19.08
Common brick masonry	20 cu.yd.	20.00	20.00	26.67
Steel reinf. bars in sewers and structures	320,000 lb.	0.04	0.04	0.04
V. c. liner plates in sewers and structures	33,000 sq.ft.	0.20	0.16	0.22
V. paving brick masonry	3,600 sq.ft.	0.20	0.30	0.33
Sidewalk frames and covers	1,000 lb.	0.08	0.20	0.18
Misc. cast iron and steel	32,000 lb.	0.13	0.20	0.16
Concrete cover plates	40 sq.ft.	2.50	3.00	2.67

Suspension Bridge Over Ohio River at Maysville, Ky.

A TOLL BRIDGE over the Ohio River will connect the Kentucky state highway routes entering Maysville with U. S. highway route 52 in Abderdeen, Ohio. Maysville is located 65 miles south of Cincinnati, and is reached by the Cumberland & Ohio R.R. from Cincinnati and Ashland and the Louisville & Nashville Ry. from Louisville. There is good ferry service near the site. The river is navigable here, and Ohio River dam 34 at Chilo maintains a pool stage at the bridge site of 461 ft. (Ohio River datum).

The new structure, as the accompanying drawing shows, consists of a main suspension bridge having a central span 1,060 ft. center to center of river piers and 465-ft. side spans from pier to cable-bent piers. Roadway is 20 ft. with 4½-ft. sidewalks on each side. The distance from the cable-bent piers to the center of anchorage on either shore is 112 ft. 10 in. The Maysville approach is 375 ft. long and consists of four deck plate girder spans 59 ft. center to center of supporting piers, with a filled plaza containing the toll house and including the anchorage and the 78-ft. deck plate girder spans connecting the anchorage with the cable-bent piers. The Aberdeen approach is 498¼ ft. long, including anchorage, and consists of five deck plate girder spans 59 ft. long, one of 62 ft., and one of 78 ft. from anchorage to cable-bent pier. The filled plaza will be built under another contract.

Work on the structure was divided into two contracts covering, respectively, the substructure and superstructure. The principal items for each of these are given in the two tables on the next page. Contractors could submit proposals for either or both contracts, which were awarded respectively to the Dravo Contracting Co. and the John A. Roebling Sons Co. Time is an important factor, and these contractors estimate 240 days for the substructure and 270 for the superstructure. The foundation contractor is to schedule his work so that erection of the superstructure may proceed expeditiously.



ELEVATION OF OHIO RIVER BRIDGE CONNECTING MAYSVILLE, KY., WITH ABERDEEN, OHIO

OHIO RIVER SUSPENSION BRIDGE

Contract I—Substructure

	A	B	C
3,200 cu.yd. conc. in caisson fdn. piers B and C	$29.00	$22.50	$35.00
3,100 cu.yd. conc. in main shafts, piers B and C	15.00	13.00	17.50
1,810 cu.yd. conc. in pier shafts behind stone facing, piers B and C	12.00	10.50	14.00
1,500 cu.yd. masonry facing above footings, piers B and C	47.00	52.00	65.00
8,750 cu.yd. mass conc. below line XX in anchorages	14.00	15.50	14.00
9,700 cu.yd. reinf. conc. above line XX in anchorages	10.00	12.45	9.00
9,000 lin.ft. precast conc. piles in place	3.00	3.90	3.00
700 cu.yd. conc. in approach pier foot	16.00	17.50	14.00
830 cu.yd. conc. above top of footings in approach piers	18.00	21.00	20.00
283,000 lb. reinf. steel in place conc. design	.04	.045	.04
270,000 lb. reinf. steel in place stone faced design	.04	.045	.04
2,200 sq.yd. waterproofing abutments, walls, etc.	.50	.60	.25
Totals concrete, items 1, 2, 5, 6, 7, 8, 9, 10, 12	$244,510	$447,655	$441,495
Totals stone, items 1, 3, 4, 5, 6, 7, 8, 9, 11, 12	460,160	493,245	496,390

Contract II—Superstructure

	A	B	C
136,000 lb. anchorage carbon steel eyebars	$0.085	$0.065	$0.071
1,540,000 lb. metal work, towers, bents, anchorages, etc.	.073	.084	.095
3,030,000 lb. metal work in truss, etc. of suspension span	.059	.074	.073
700,000 lb. metal work in approaches	.055	.064	.0635
1,300,000 lb. metal work, main cable	.175	.18	.175
105,000 lb. metal work, suspender rope, etc.	.30	.30	.30
10,500 lb. metal work, hand rope, etc.	.20	.20	.20
115,000 lb. metal work, cable bands, etc.	.25	.25	.25
8 M MFBM timber in inspection footwalks	125.00	200.00	100.00
1,850 cu.yd. conc. in roadway, curbs, sidewalks, etc.	22.00	25.00	24.00
119,000 lin.ft. roadway reinf. trusses	.20	.20	.17
140,000 lb. reinforcing steel	.05	.045	.035
Manhole frames, covers, etc. (lump sum)	1,000.00	880.00	800.00
Totals for clamped cables	$704,600	$782,400	$782,576
For wrapping cables add	16,000	16,000	18,900
Totals for wrapped cables	720,600	798,400	801,476

In addition to waterproofing backs of abutments and walls, the foundation contractor will apply two coats to all interior walls of anchorage chambers. He also must dispose of anchorage and approach excavation. The Maysville anchorage will be founded on good sand at an elevation below the normal pool level of the river. Although it may not be possible to dry the excavation before placing the footings, the contractor is required to construct dams and try pumping. If unsuccessful, tremie methods may be used until the dams have been sealed against hydrostatic pressure, when the foundation will be pumped and the remainder of the concrete placed in the dry. The Abderdeen anchorage is on sand above pool stage. The two main river piers will be on rock, and the foundations will be constructed by the pneumatic process, with concrete placed in the dry. Price for concrete below tops of footings includes cost of caissons, excavation, backfill and air plant. Concrete is of four classes: D, F, B and A. Class D, for concrete piles, is 1:2:3; 3,000 lb. in 28 days; coarse aggregate ¼- to 1-in. Class F, for paving, is 1:2:3½; 2,800 lb.; coarse ¼- to 1½-in. Class B, for mass, is 1:2½:5; 2,000 lb.; coarse ¼- to 2½-in. Class A, for all other construction, is 1:2:4; 2,500 lb.; coarse aggregate, ¼- to 1½-in.

To expedite the work the contractor may be required to proceed simultaneously with the river piers, anchorage-bent piers and the anchorages, in order to prepare work for the erection of the main towers, cable bents and anchorage steel, and follow with the cables. The cable is formed of 61 strands of fabricated cables 1½ in. in diameter containing 51 galvanized wires in each strand, making a net cable area of 81.557 sq.in. The first total price for contract 2 is for clamped cables, cost of wrapping being estimated separately and amounting to 2.22 per cent of the total contract price for wrapped cable. Contract was awarded on wrapped cable, wrapping being done after all dead load is on the structure. On completion of cable wrapping, the high-tensile bolts in the cable bands are to be tightened.

Unit prices are given of the lowest three bidders on each of the two contracts. On contract 1 these are: A, Dravo Contracting Co., Pittsburgh; B, Foundation Co., New York; C, Pacific Bridge Co., Portland, Ore. Contract 2: A, John A. Roebling Sons Co., Trenton; B, Independent Bridge Co., Pittsburgh; C, McClintock-Marshall Co., Cincinnati. Work is under supervision of the Kentucky state highway department; Modjeski & Masters, consulting engineers.

Reservoir Dam Across Pecan Bayou Near Brownwood, Tex.

BIDS were opened Nov. 6 by the Brown County Water Improvement District No. 1 for the construction of a reservoir dam across Pecan Bayou, 8 miles above Brownwood, Tex. The dam involves the construction of an irrigated, sprinkled and rolled earth embankment containing 736,000 cu.yd., of which about 70 per cent will consist of impervious clays and shale, the remainder being more or less pervious earth, fine gravel and small rocks, with some solid rock. Two 12-ft. heavily reinforced-concrete conduits will be constructed through the base of the embankment, in which 12x12-ft. gates, of the self-closing type, will be installed. These gates, with their guides and lifting devices, will be furnished by the owner.

All except 180,000 cu.yd. for the embankment will be taken from the spillway channel, 2,000 ft. northeast of the dam. This will be an unobstructed channel 450 ft. wide on the bottom, the maximum depth of cut being about 45 ft. The borrowed material, mostly clay, will be taken from selected pits 800 to 1,200 ft. from the dam. An industrial railway and crawler wagons are proposed for transporting and spreading this material. The material in the spillway consists of clays and shale and a limestone ledge from 3 to 6 ft. thick, containing about 30,000 cu.yd., some of which will be used for riprap, the remainder to be placed in the lower toe of the embankment.

Riprap from 12 to 18 in. thick resting on a 6-in. crushed rock blanket will be placed on the upper face of the dam. A section of the downstream slope will also be riprapped.

Rock for coarse and fine aggregate, also for all other purposes, will be obtained from a ledge of hard limestone which caps the escarpment adjacent to the dam. This ledge is 20 to 25 ft. thick and of excellent quality for all purposes. It is situated about 125 ft. above the bed of the stream and about 800 ft. from the center of the embankment.

Nineteen bids were received, average of the lowest six being $605,028. Unit prices are given of the lowest three: A, Standard Paving Co., Fort Worth (contract); B, Stevens Bros. & Miller-Hutchins, Sellers, La.; C, Gifford-Hill Co., Inc., and L. H. Lacy Co., Inc., Dallas.

	A	B	C
42,500 cu.yd. core trench excav., class 1	$0.50	$0.30	$0.27½
500 cu.yd. core trench excav., class 2	5.00	3.00	2.00
22,000 sq.ft. steel sheetpiling in core trench	1.45	1.35	1.46
48,000 cu.yd. conduit excav.	.90	.50	.72
4,070 cu.yd. 2,500 lb. con. in conduits	9.00	13.00	9.35
590 cu.yd. 1,000 lb. con. in conduits	9.25	13.00	7.55
1,100 cu.yd. 2,500 lb. con. in gate well	13.75	15.00	11.60
11 cu.yd. 1,000 lb. con. in gate house bridge pier	17.50	20.00	10.60
Completing gate house above floor (lump sum)	1,200.00	2,000.00	660.00
1,760 cu.yd. 1,500 lb. con. in conduit inlet and outlet structures	9.50	13.00	8.00
320 cu.yd. 1,000 lb. con. in conduit inlet and outlet structures	9.00	13.00	5.30
800 cu.yd. 1 to 14 con. in conduit outlet	6.30	13.00	5.30
1,570 cu.yd. loose rockfill beyond conduit outlet	4.00	2.50	2.50
735,800 cu.yd. dam embankment, irrigated, sprinkled and rolled	.30	.29	.349
5,000 cu.yd. gravel or crushed rock blanket	2.75	3.00	2.00
13,200 cu.yd. rock riprap on slopes of dam	2.75	2.40	2.00
1,500 lin.ft. 8-in. slope drain pipe	.80	1.00	.75
10 cu.yd. 1,000 lb. con. drain boxes	20.80	20.00	15.00
560 lin.ft. 6-in. drain tile along conduit	1.25	1.00	.90
1,550 lin.ft. gravel or crushed rock for roadway	2.00	1.30	1.20
35 lin.ft. pipe hand rails	4.00	3.00	2.40
30,000 cu.yd. solid rock excav. in spillway and borrowpits	.90	1.15	1.25
550 cu.yd. 1,000 lb. con. in spillway protecting wall	9.25	15.00	7.70
1,200 cu.yd. protecting wall excav.	1.00	1.00	.40
650 cu.yd. puddle backfill around spillway protecting wall	.65	.50	.40
14,000 bbl. cement	3.00	2.80	2.92
1,344,000 lb. reinforcing steel	.03¼	.04	.039
180,000 lb. installing structural steel and gates	.02	.02	.022
Totals	$590,003	$595,392	$597,377

CONSTRUCTION NEWS

Some of the Week's Large Projects

For further details turn to the appropriate sections in this issue

Location	Project	Cost	Status
Sewers			
Chicago	Sewer	$2,083,000	Contract
Bridges			
Indiana and Kentucky	Bridge	1,399,220	Contract
St. Louis	Bridge approaches	3,250,000	Proposed
Cleveland	Bridge	6,000,000	Proposed
Excav. Dredging			
Texas	Irrigation work	10,000,000	Proposed
Railways			
West Virginia	Railway tunnels	1,248,787	Contract
Power Plants			
Colorado	Power plants	1,000,000	Proposed
Augusta (Ga.)	Power plant	1,000,000	Proposed
Everett (Mass.)	Power plant, etc	3,000,000	Proposed
Warehouses			
Los Angeles	Warehouse	1,000,000	Contract
Fed. Govt.			
Lewisburg (Pa.)	Penitentiary.....App.	3,850,000	Bids asked
Buildings			
Long Beach (N. Y.)	Apartment	1,000,000	Separate contract
New York	Apartment	1,600,000	Contract
New York	Church	1,000,000	Proposed
Cleveland	Hospital	1,000,000	Proposed
Baltimore	Library	2,000,000	Bids asked
Worcester (Mass.)	Auditorium	2,000,000	Proposed
Kansas City (Mo.)	Office	2,500,000	Contract
Toronto (Ont.)	Government	1,000,000	Proposed
Port Chester (N. Y.)	High School	1,000,000	Bids asked
Pittsburgh	Schools	1,250,000	Bids asked
Cincinnati	Station	4,000,000	Proposed
Oakland (Calif.)	Theatre	1,000,000	Proposed
Toledo (O.)	Y. M. C. A.	1,000,000	Proposed

WATERWORKS

PROPOSED WORK

Ark., Paris — Enlarging dam in Short Mountain Creek by raising same from 17 to 30 ft. and adding wing, increasing capacity 150,000 gal., drilling deep wells near Arkansas River, and 6 in. c.i. mains from well to city. $90,000. W. L. Winters, Merchants Bank Bldg., Ft. Smith, engr. **Maturity indefinite.**

Calif., Santa Cruz — Rejected bids 8,000-10,000 lin.ft. welded steel water pipe. Will probably purchase in open market. Noted Oct. 30.

Mass., Newton—City, 825 Beacon St., supply building incl. altering and constructing 1 story, basement, brick storehouse and garage addition, plain found., Watertown St., for Water Dpt. $40,000. C. C. J. White, 825 Beacon St., engrs. Noted Oct. 30.

Mass., Worcester — City, L. Goodale, water comn., preliminary sketches by J. Rustigian, 16 Norwich St., 1 story pumping station, Holden, part of $400,000 pipe line project, Quinapoxet Pond to Kendall Reservoir. Noted Sept. 11.

N. J., Oakhurst—Comrs. Ocean Twp. revised preliminary plans chlorination plant. $75,000. G. R. Moore, 603 Mattison Ave., twp. engr.

N. J., Oakland—Bd. Boro Council, waterworks, $15,000 or more.

Pa., Ridgway—Boro voted bonds enlarging storage dam, taking up present 12 in. line from pump station to reservoir, relaying same from reservoir to town, new 20 in. main from pump station to reservoir. C. K. Gifford, Ridgway, engr. Noted Oct. 23.

Wash., Olympia—Dpt. P. Wks., C. L. Dufault, comr., 2¼ m.g. reservoir adjoining existing city reservoir and 250,000 gal. elevated storage tank.

Wash., Seattle—Municipal Water Dpt., W. B. Severyns, supt. improving, extending waterworks, incl. 42 in. overflow pipe line to carry surplus water from Lake Youngs into Maple Valley, $25,000; finishing diking, deepening, clearing Lake Youngs, $20,000; clearing, draining Walsh Lake, $20,000; clearing, cleaning Cedar Lake, $5,000; fencing lower waterhead between Landsburg and Snoqualmie and improvement of trails, $12,000.

Ont., Cornwall—City, 2 mi. 16- to 20-in. c.i. watermains. $100,000. C. A. Lount, Cornwall, supt.

Ont., Fort William—City, watermain installation incl. connecting 6 dead ends of mains, replacing 4 in. main with 8 in. main in Archibald Ave. $21,000. C. B. Symes, City Hall, engr.

Ont., Ottawa—For 1 mi. 6 in. up c.i. watermain west of Parkdale Ave. $35,000. A. F Macallum, City Hall, engr.

Ont., Sudbury—City, 6 and 12 in. mains in Douglas St. and 6 in. mains in Lourdes and John Sts. $21,695. W. McMullan, Mackie Blk., engr.

BIDS ASKED

Calif., Beverly Hills—Dec. 16, by City Council, 5,050 ft. 14 in. Class A and B c.i. or Class 100 and 150 centrifugal c.i. pipe line in Maple Dr.; 900 lin.ft. 16 in., 2,390 lin.ft. 14 in. and 1,125 lin.ft. 8 in. pipe line for Water Treatment Plant 2.

Calif., Monrovia—Dec. 15, by F. A. Dupar, city clk., booster pump for Ivey Avenue Pumping Plant.

Kan., Neodesha—See "Contracts Awarded."

N. Y., Brooklyn—Dec. 10, by R. P. Patterson, comr. Dpt. Correction, Municipal Bldg., New York, new galvanized iron pipe wafer supply lines, branches, controlling valves, closet flush valves, basin faucets, shower bath fixtures, hot water storage tank, in Male Prison at Prison, 149 Ashland Pl.

Okla., Hollis—City in market 200 g.p.m. centrifugal pump against 140 ft. head for Waterworks Dpt. A. Thompson, city clk.

Okla., Lawton—Dec. 19, by T. Sanders, city clk., new filtration plant, waterworks extensions, $600,000. Burns & McDonnell Eng. Co., Interstate Bldg., Kansas City, Mo., engrs. Noted Nov. 27.

Okla., Wetumka — W. H. Burkes, city clk. opened bids Dec. 1, impounding reservoir, spillway, pipe line, pumps, transmission line, 2 motor driven pump units, 9,000 ft. 8 in. c.i. mains, 40,500 cu.yd. earth and rock excav. $65,000. Long & Co., 1300 Colcord Bldg., Oklahoma City, engrs. This corrects report in Nov. 27 issue.

Okla., Tulsa—Dec. 9, by E. Logan, city and new low service pumping station, $17,000; three 12 m.g.d.c. low service motor driven centrifugal pumping units with priming units; 6 panel switchboard and wiring connections. V. H. Cochrane, 304 Wright Bldg., Tulsa, engr.

Pa., Coraopolis—Dec. 11, by Boro, Municipal Bldg., W. E. Cain, secy., 2 booster water pumps, 2 motors. Edeburn Cooper & Co., Law and Finance Bldg., Pittsburgh, engrs.

Pa., Franklin — Taking bids two 1 m.g.c. water storage tanks. Foundation and water lines, by day labor; 5,800 ft. 12 and 16 in. c.i. pipe, to U. S. Pipe & Fdry. Co., Oliver Bldg., Pittsburgh. Est. $45,000. J. McK. Snow, City Bldg., engr. Noted Nov. 20.

B. C., North Vancouver — See "Contracts Awarded."

Ont., Niagara Falls—Dec. 20, by Bd. Water Comrs., W. A. McDowell, secy., furnishing, installing switching and filter equipment; supplying low tension, step down transformers.

Ont., North Bay—See "Contracts Awarded."

Ont., Ottawa — Dec. 23, by Secretary Bd. Contr. superstructure filtration plant, incl. administration building and laboratory. $350,000. A. F. Macallum, city engr.

Ont., Ottawa—Jan. 5, by Secretary Bd. Control, filter equipment for new filtration plant at Lemieux Island. $200,000. A. J. Macallum, city engr.

Ont., Rockland—See "Contracts Awarded."

CONTRACTS AWARDED

Ark., Clarksville—System of wells about 4 mi. from city, reservoirs, flow line to city standpipe, to P. D. Bowler, and to Fairbanks-Morse Water Supply Co., 900 South Wabash Ave., Chicago, Ill. Est. $140,000.

Calif., Beverly Hills — B. J. Firminger, city clk., rein.-con. sediment basin, mixing tanks, clarifier structure at Water Treatment Plant 2, to Nead Constr. Co., 809 Avalon Rd., Wilmington, $24,918. Noted Nov. 27.

Conn., Stamford—Stamford Water Co., 25 x 40 ft. pumping station, Sycamore Terrace, to P. Bacco, 33 Bank St. Est. $15,000.

Ia., Oskaloosa — Oskaloosa Municipal Water Plant, V. B. Trueblood, supt., furnishing, installing 400,000 gal. suspended steel tank, incl. footings, flange connections at bottom, not incl. cost razing old standpipe, to Pittsburgh-Des Moines Steel Co., Tuttle and Southwest 10th Sts., Des Moines, $24,243.

Kan., Neodesha—Waterworks improvements, incl. filtration and water softening plant, day labor, $65,000. Black & Veatch, 700 Mutual Bldg., Kansas City, Mo., engrs. Noted Nov. 27.

Mass., Holyoke—See "Materials."

Minn., St. Paul—City, steel gravity tank, to Chicago Bridge & Iron Wks., 37 West Van Buren St., Chicago, Ill., $23,860; concrete retaining ring, to P. J. Pappenius, St. Mary's Bldg., St. Cloud, $1,601.

N. Y., Brooklyn—J. J. Dietz, comr. Water Supply, Gas & Electricity, Municipal Bldg., New York, mains in Avenues W and O, G. V. Cornell Co., 30 Egbert Pl., at St. George, $11,000 and $5,999 respectively; Autumn Ave., to Knidem Constr. Co., 4197 Park Ave., New York, $5,480. Grand total $22,479. Noted Nov. 18.

N. Y., Colonie—Water Comrs. Lathams Water Dist., at Pitts Hose Co., Lathams, Colonie, extending waterworks, to W. G. Fritz Co., 69 Main St., West Orange, N. J., and F. G. Blair & Sons, Newton. Noted Oct. 16.

Pa., Franklin—See "Bids Asked."

B. C., North Vancouver — City replacing wooden mains with 6 and 8 in. c.i. mains, day labor, $25,000 voted for same. C. S. Hanes, city engr.

B. C., West Vancouver—City, 4,000 ft. 14 in. steel pipe (British made), to Leith Murray & Co., 510 West Hastings St., Vancouver, $12,224; wood pipe, to Canadian Wood Pipe & Tanks, Ltd., 550 Pacific St., Vancouver, $3,827; 51,000 lb. lead and 33,200 ft. spun c.i. pipe (Canadian made), to Evan, Coleman & Evans Ltd., foot Columbia Ave., Vancouver, $2,492 and $31,197 respectively; special, to Empire Brass Co., 1038 Homer St., Vancouver, $901. Grand total $50,641. Noted Oct. 23.

Ont., Cornwall—Town, to National Iron Corp. Ltd., Cherry St., 5,948 ft. 20 in. pipe at $45 per ton, 2,924 ft. 18 in. $45, and 1,150 ft. 16 in. $40. Noted Nov. 13, under "Contracts Awarded."

Ont., Durham—Laying mains to W. B. Russell, 1104 Hermant Bldg., Toronto, $5,510; c.i. pipe, castings, to Natl. Iron Corp., Cherry St., Toronto, $11,985; standpipe, to Toronto Iron Wks., Eastern Ave., Toronto, $6,850; gate

See proposal advertising on page 125

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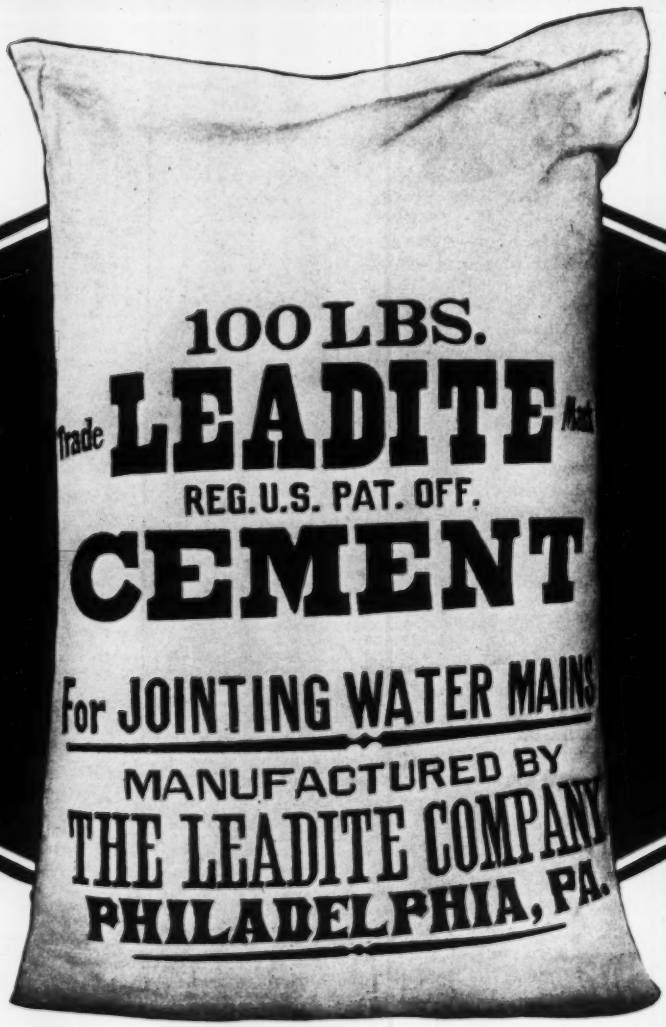
LEADITE

Trade Mark Registered U.S. Pat. Office

Used on thousands of miles of water mains.

Approved by Water Works Men—most everywhere.



Makes a good tight joint, which improves with age.

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The Pioneer self-caulking material for c. i. pipe.
Tested and used for over 30 years.
Saves at least 75%

THE LEADITE COMPANY
Land Title Building Philadelphia, Pa.

No Caulking

Waterworks (Continued)

valves, hydrants, to Kerr Engine Co., Walkerville, $2,443. Grand total $26,788. Noted Nov. 20.

Ont., Niagara Falls—W. A. McDowell, secy.-treas. Bd. Water Comrs., pumps in connection with waterworks filtration plant to Babcock-Wilcox & Goldie-McCullough, 64 Grant St. S. Galt, $18,653; transformers, to J. C. Scott, 667 McDougall St., $3,780; wash water tank, to Horton Steel Wks., Bridgeburg, $3,650; one 500 hp., two 75 hp. and one 40 hp. motors, to English Electric Co. of Canada, George St., St. Catherines, $7,170. Grand total $33,253. Noted Oct. 23.

Ont., North Bay — Town Clerk, new watermains, sewers, day labor. $60,000. Pipe to be purchased.

Ont., Rockland—Village, repairing, extending mains, day labor. $50,000. Pipe to be purchased.

SEWERS

PROPOSED WORK

Ark., Dumas—Preliminary plans sanitary sewerage system in Sewer Impvt. Dist. 1. $45,000. F. R. Allen, Pine Bluff, engr.

Calif., Redwood City—San Mateo Co., sewers in Colma and Daly City Sections, incl. 6- to 15-in. vitr. clay pipe, 330 manholes, concrete sedimentation tank, two 400, two 500 and one 140-g.p.m. pumps. $146,000. R. A. Klassen, Redwood City, engr. Noted Nov. 13.

Ill., Collinsville—City soon takes bids Sewer District B. $264,593.

Ind., Franklin — Rebuilding sewage plant. $35,000. Address City Clerk.

Mass., Woburn — City extending Aberjona Valley Sewer. $25,000 or more. H. V. Mackey, supt. P. Wks.

N. J., Cedar Grove—Town Council, Town Hall, installing sanitary sewerage system. $667,000. Boughton & Lawson, 843 Broad St., Newark, town engrs.

N. J., Elizabeth—Bd. P. Wks., City Hall, preliminary plans 1 mi. storm water sewer in Alina St. $25,000 or more. T. Collins, city engr.

N. J., Newark—Bd. City Comrs., City Hall, relocating and reconstructing main intercepting sewer vicinity of Raymond Blvd., Market and Raymond Plazas. $500,000. J. Costello, city engr.

N. J., Plainfield—Common Council, City Hall, storm water sewer in West Front and South 2nd Sts. $225,000. A. Vars, city engr. Noted Nov. 25 Daily.

N. M., Famington—Soon takes bids sanitary sewerage system, disposal plant. $75,000. H. G. Olmsted, El Paso, Tex., engr.

Okla., Bartlesville—Soon takes bids sewage disposal plant. To exceed $25,000. Black & Veatch, 700 Mutual Bldg., Kansas City, Mo., engrs. Noted Oct. 9.

O., Bowling Green—Smith & Niles Co., engrs., Nicholas Bldg., Toledo, to make report on probable cost for sewage treatment works, connecting sewers. A. Bachman, mayor.

Okla., Tulsa—Sewage disposal plant in Flat Rock Dist. $150,000. Black & Veatch, 700 Mutual Bldg., Kansas City, Mo., engrs.

Ola., Tulsa—Preliminary plans enlarging sewage disposal plant at Mohawk Park, near here. $75,000. H. A. Parker, City Hall, engr.

Pa., Pittsburgh—M. C. Smith, secy. Shaler Twp., Mt. Royal Blvd., new bids early in December, 116,300 ft. 8- to 24-in. terra cotta sewers, 400 manholes, 64 lampholes in Dists. 1, 1-A, 2 and 3, Shaler Twp. $150,000. Former bids rejected. F. G. Ross, 309 4th Ave., engr. Noted Sept. 25.

Pa., Ridgway—Boro, S. F. Greiner, secy., Ridgway Natl. Bank Bldg., sewage disposal plant. **Maturity indefinite.** C. Keeler, Gifford, Ridgway, engr.

Utah, Ogden—City, storm sewer in 24th St. from Washington to Wall Aves. and along Wall Ave. to 21st St. $45,500. J. C. Brown, city engr.

Man., Tuxedo—Municipality soon takes bids sewer. $35,000.

Man., West Kildonan — Municipality soon takes bids sewers, paving. $98,000.

N. S., New Waterford—City Council sewers and asphalt paving. $109,205.

Ont., Hamilton—City, 8 in. and up vitr. tile storm sewerage system in Valley St. sect. $500,000. W. L. McFaul, City Hall, engr.

Ont., Ottawa—City Council, 3 to 4 mi. concrete, rein.-con., and vitr. clay storm and sanitary sewers. $178,000. A. F. Macallum, City Hall, engr.

Ont., Ottawa — Secretary Bd. Control soon takes bids 9 in. sewer in Primrose Ave., $676; 18 in. sewer in Craig St., $14,276; 12 in. sewer in Railway St., $1,745. A. F. Macallum, City Hall, engr.

Ont., Port Colborne—Town, 2¼ mi. 8 in. and up vitr. tile sanitary and storm sewers in northeast section. $60,000. T. S. Scott, Port Colborne, engr.

Ont., Toronto—Soon takes bids 12 in. and up vitr. clay storm sewers in Palmerston Ave. and Church St., $61,275. R. C. Harris, City Hall, engr.

Ont., Toronto — East York Twp., sanitary sewers in Hillsdale Ave., $4,681; Lumley Ave., $3,984; storm and sanitary sewers in Noel Ave., $6,537; Bayview Ave., $14,525. G. R. Jack, 443 Sammon Ave., Toronto, engr.

BIDS ASKED

Ill., Chicago — Dec. 11, by Bd. Trustees Sanitary Dist. of Chicago, 910 South Michigan Ave., West Side Sewage Treatment Works-Div. AA.

Mass., Boston — Dec. 8, by Dpt. P. Wks., J. A. Rourke, comr., sewerage works in Brighton and West Roxbury. $25,000.

Mass., Boston—Dec. 10, by Dpt. P. Wks., sewerage works in Dorchester and Roxbury. $25,000. J. A. Rourke, comr. Dpt. P. Wks.

Mich., Monroe—Dec. 8, by J. H. Eber, city clk., 2 vertical non-clogging sewage pumps for dry pit installation, complete with motors and switches with 150 g.p.m. capacity against head varying from 9.5 to 12.5 ft.

N. J., Ventnor (br. Atlantic City)—Joint Bd. City Council, City Hall, Margate City, bids about Jan. 15, joint disposal plant, Shelter Island, for Cities of Ventnor and Margate City. $400,000. E. D. Rightmire, 530 Guarantee Trust Bldg., Atlantic City, city engr. Noted Nov. 13.

N. Y., Brooklyn—Dec. 11, by H. Hesterberg, pres. Brooklyn Boro, Boro Hall, storm water and sanitary sewers in Quentin Rd., Voorhies and Narrows Aves., 68th and West 6th Sts.; manhole heads and covers for remainder year 1930; sewer basin culverts, sewer basins at various locations.

N. Y., Far Rockaway — Dec. 6, by Comrs. West Long Beach Sewer Dist., Nassau Co., at office Sprague, Morris & Fluckiger, Savings Bank Bldg., sewers, appurtenances in West Long Beach Sewer Dist. Hoadley & Giles, Binghamton, engrs.; adv. E. N.-R. Dec. 4.

N. Y., New Rochelle — Dec. 19, by Westchester Co. Sanitary Sewer Comn., E. S. Martin, secy., Court House Annex, White Plains, 1 mi. 12- to 20-in. c.i. trunk sewer Sect. X, Mamaroneck Project, principally located here; adv. E. N.-R. Dec. 4.

N. Y., Troy—Dec. 9, by City, vitr. sewer, manholes in 9th Ave. C. Morris, city engr.

N. Y., Yonkers — Dec. 19, by Westchester Sanitary Sewer Comn., E. S. Martin, secy., Court House Annex, White Plains, 2 mi. trunk sewer mostly 78 in. tunnel with connections, appurtenances, from Lake Ave. to Locust St.; adv. E. N.-R. Dec. 4.

O., Cleveland Heights—Dec. 8, by City, 2,500 ft. concrete or tile sewers in Euclid Blvd. from Berkshire to Hampshire Rds. To exceed $25,000. F. A. Pease Eng. Co., Terminal Tower, Cleveland, engrs.

Okla., Barnsdall—Dec. 9, by O. E. Cox, city clk., 15,000 ft. sanitary sewer extensions. $25,000. Long & Co., 1300 Colcord Bldg., Oklahoma City, engrs. Noted Aug. 28.

Pa., Natrona—Dec. 10, by Bd. Comrs. Harrison Twp., Town Hall, 41 Chestnut St., sewer beginning in Tarentum running 2,000 ft. in Frazer Twp. to Little Bull Creek Valley, Harrison Twp., incl. 3.25 mi. 15 in. terra cotta or concrete pipe, 600 ft. 16 in. c.i. pipe for 12 creek crossings, 60 to 70 brick manholes and siphon chamber at Bull Creek end; one 500 g.p.m. vertical shaft centrifugal non-clogging pump and motor. $75,000. C. E. Miller, Jenkins Arcade, Pittsburgh, engrs.

Ont., Belleville—See "Contracts Awarded."

Ont., Copper Cliff—See "Contracts Awarded."

CONTRACTS AWARDED

Calif., Los Angeles—See "Streets and Roads."

Ill., Chicago—Sanitary Dist. of Chicago, 910 South Michigan Ave., R. A. Woodhull, chn., Contr. 3, West Side Intercepting Sewer, 2 mi., to Ryan Co., 4500 West Division St., $2,083,300. Noted Oct. 30.

Kan., Columbus—F. H. Hawkins, city clk., reconstructing 2 sewage disposal plants, to Reed & Wheelock, Clay Center, $50,558. Noted Aug. 21.

Kan., Topeka—City, 1,000 ft. 9 ft. and 1,000 ft. 8 ft. precast concrete storm sewers between Kansas River, 2nd and Polk Sts., to C. A. Ritchie, 1600 McVicker St., $62,217. Noted Nov. 6.

Md., Baltimore—Bd. Awards, sanitary sewers, storm drains, Storm Water Contr. 158, to Angelozzi Contg. Co., Everall St. and Mayberry Ave. $77,047.

Md., Baltimore—Bd. Awards, sanitary sewers, Sanitary Contr. 271, to Ryan Contg. Co., 1500 Arch St., Phila., Pa., $92,307.

O., Garfield Heights (br. Cleveland)—Village, sewer and water connections in Clearview Rd. and Park Knoll Dr., to D. Rossi-Marcelletti Co., 11700 Willard Ave., Cleveland, $17,857; Crest Ave. and East 125th St., to George Bros., State Rd., Cleveland, $6,799.

O., Lima—Sewage disposal plant, to Green & Sawyer, Main St., $480,705. Est. $500,000. Noted June 26.

Okla., Nichols Hills (Oklahoma City, P. O.)—T. A. Montague, town clk., storm sewers in business section, to L. Sanders, Tradesmens Bldg., Oklahoma City, $48,890 est. $60,000; sanitary main sewers in residential streets and sanitary lateral sewers in Sewer Dist. 1, to Bensen & Henderson, Herskowitz Bldg., Oklahoma City, $32,500 and $30,467 respectively, ests. $50,000 and $35,000 respectively. Noted Nov. 13.

Pa., Phila.—Dpt. P. Wks., Bureau Eng. & Surveys, City Hall Annex, to Campellone & Diorio, 3856 North 10th St., branch sewers in Ditman St. from Mcnamy to Hartel Sts. $690, Gray Ave. from 49th to 53rd Sts. $3,378, Gray Ave. from 55th to 58th Sts. $2,116, Holly St. from Haverford to Fairmont Sts. $7,420, Knorr St. from Roosevelt to Brous Sts. $2,164; to A. Frunzi, 513 High St., G St. from Huntington Park to Ramona Sts. $990, 31st St. from Montgomery to Morse Sts. and Morse St. from 31st to 32nd Sts. $12,367; to V. Ventresco, 6113 Ross St., H St. from Luzerne to Lycoming Sts. $2,647; to J. McGlory, 4024 Laurison St., Haverford St. from 67th to 69th Sts. $6,277, Mansfield Ave. from Washington Lane to Upsal St. 2,855, grading, drainage structures in Rhawn St. and bridge over Pennypack Creek $17,575; to V. Neamond, 628 Levick St. branch sewers in Monument St. from 32nd to 33rd Sts. $3,945; to R. Revito, 6314 Dicks Ave., County Prison Intercepting Sewer along Pennypack Creek $6,922; to Yetman & Garfola, 3701 North Broad St., Upper Frankfort Creek Low Level Sewer and connections in Frankfort Creek from Frankford to Wyoming Aves. $112,123. Grand total $181,469. Noted Oct. 30.

Utah, Salt Lake City—City Comn., sewers in 27th South St. to Mullins & Wheeler, Christensen & Gardner, Vermont Bldg., and J. H. Tempest, Salt Lake City, $139,935. Est. $132,750. Noted Nov. 13.

Ont., Belleville — Town, sewers in Bleeker Ave., Purdy, and Balvin Sts., day labor, $45,000. J. W. Holmes, clk. Pipe purchased by contract.

Ont., Copper Cliff—International Nickel Co. of Canada Ltd., J. L. Agnew, genl. mgr., sewer extensions, road widening, day labor, under supervision of company's engineers. $100,000.

WASTE DISPOSAL

PROPOSED WORK

N. J., Closter—Bd. Boro Council, municipal incinerator. $25,000.

Ont., Ottawa—City, two 50 ton garbage incinerators, brick, concrete 1 in Leese Ave. other in west end city. $150,000. A. F. Macallum, city engr.

BIDS ASKED

O., Cincinnati—Dec. 9, at office Comrs. Hamilton Co., County Court House, incinerator building at Hamilton Co. Tuberculosis Sanatorium, Guerley Rd. H. Hake, 2400 Gilbert Ave., and Samuel Hannaford & Sons, 1024 Dixie Terminal Bldg., assoc. archts.

BRIDGES

PROPOSED WORK

Md., Baltimore—City, concrete, steel bridge over Gwynn's Falls, on Baltimore St. $400,000. N. L. Smith, Municipal Bldg., bys. engr.

Mass., Norton—Town, A. S. Lincoln, supt. Street Dpt., rein.-con. bridge, $25,000.

Mich., Port Huron—Bids in February, substructure and superstructure bascule type bridge over Black River, at 7th St. $185,000. Waddell & Hardesty, 150 Bway., New York, engrs. Noted Sept. 18.

Minn., St. Michael — Hennepin Co. (Minneapolis) and Wright Co. (Buffalo) steel bridge over Crow River on Co. Rd. 8. $53,000. W. E. Duckett, engr. Hennepin Co., Minneapolis.

Minn., Sauk Center—Great Northern Ry. Co., J. R. W. Davis, ch. engr., St. Paul, steel concrete bridge over South Main St. $25,000.

Mont., Culbertson—State Hy. Comn., Helena, bridge over Missouri River, in Richland and Roosevelt Counties. $400,000. Richland Co. voted $50,000, its share of cost.

Mo., St. Louis—Bd. P. Serv., City Hall, bids early in 1931, 5 double track elevated railroad approaches to St. Louis Municipal Bridge over Mississippi River between here and East St. Louis, Ill. $3,250,000. C. E. Smith & Co., 1752 Railway Exch. Bldg., engrs. Noted Sept. 18.

N. J., Point Pleasant—Bd. Freeholders Ocean Co., Court House, Toms River, steel or timber bridge with swinging draw span over Beaver Dam Creek connecting Metedeconk with Point Pleasant. $25,000. H. C. Shinn, Municipal Bldg., Lakewood, co. engr.

Ohio—R. N. Waid, dir. hys., Columbus, received no bids Nov. 18, four 90 ft. span, steel girder bridge, and grading, slag or stone paving 0.589 mi. Sect. "Painsville Bridge" Wickliffe-Madison Rd., Lake Co., $132,199. Will readvertise. Noted Nov. 13.

O., Cleveland—Bd. Comrs. Cuyahoga Co. and Cleveland, Cincinnati, Chicago & St. Louis R.R., H. Baldwin, ch. engr., Cincinnati, rein.-con., steel bridges on Brookpart and Settlement Rds. $400,000 each.

O., Cleveland — Bd. Comrs. Cuyahoga Co., rein.-con., structural steel bridge, Main Ave. $6,000,000. Wilbur Watson & Associates, 4614 Prospect Ave., consult. engrs. Noted Nov. 20.

Oklahoma — State Hy. Dpt., Oklahoma City, preliminary plans bridge over Neosho River near Miama, Ottawa Co., $100,000; 700 ft. truss bridge over Cimarron River, near Guthrie, Logan Co., $100,000. A. R. Losh, ch. hy. engr.

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Bridges (Continued)

Okla., Thomas—Custer Co. (Arapahoe) rein.-con., steel bridge over South Canadian River, near here. $300,000. R. James, 519½ West Main St., Oklahoma City, engr.

Okla., Tulsa—Preliminary plans bridge over Arkansas River near 21st St. $610,000. H. A. Parker, City Hall, engr.

Tex., Ft. Arthur—Jefferson Co., B. B. Johnson, judge, and Southern Pacific Ry. (in Texas and Louisiana), Texas and New Orleans R.R., R. W. Barnes, Southern Pacific Bldg., Houston, eh. engr., steel, concrete bridge over Intracoastal Canal, south of West Pt. Arthur. $275,000. Work starts soon under supervision of railroad.

Tex., Fort Worth—Tarrant Co., c/o W. E. Yancey, aud., 9 steel, concrete bridges on lateral roads. Damon & Davis, Fort Worth, co. engrs.

Tex., Houston — City, c/o W. E. Monteith, mayor, soon takes bids rein.-con. bridge over Brays Bayou. $50,000. J. M. Nagle, city engr.

Wash., Seattle—Bd. P. Wks., approaches to University Bridge. $675,000. A. O. Piper, assistant city engr.

BIDS ASKED

Illinois—See "Streets and Roads."

Ind., Richmond — Dec. 18, by Bd. Comrs. Wayne Co., Court House, 726.5 ft. rein.-con. bridge, 47 ft. wide with center roadway 32 ft. wide and two 6 ft. sidewalks, over Whitewater River at South G St., $272,000. W. H. Brooks, Richmond, co. aud.

Iowa—Dec. 9, by State Hy. Comn., Ames, 40 x 24 ft. I-beam bridge with two 28 x 24 ft. I-beam approach spans, 3 culverts, extensions, near Council Bluffs Rd. 75, F.A.B. 46 Pottawattamie Co. — 11 culverts, extensions, near Hamlin, Primary Rd. 7, F.A.B. 320 Audubon Co. —16 culverts, extensions, Primary Rd. 71, F.A.B. 314 Cass Co., 11 culverts, extensions, near Charles City, Primary Rd. 18, B-260 Floyd Co.—extending 6 x 7 ft. box culvert, near Glenwood, Primary Rd. 34, F.A.B. 15 Mills Co. C. R. Jones, aud.

Minnesota — Dec. 9, by State Hy. Dpt., St. Paul, Bridge 3954 on S. P. 9-35 at Hokah, Houston Co.—Bridges 5029, 5030, and 5044, on S. P. 61-23, Koochiching Co., south of Big Falls. Noted Nov. 20.

Minnesota—Dec. 22, by A. P. Erickson, aud. Hennepin Co., Minneapolis, steel bridge and straightening old approaches over Crow River on Co. Rd. 8, for Hennepin Co. (Minneapolis) and Wright Co. (Buffalo). $35,000. W. E. Duckett, Minneapolis, co. engr.

New Jersey—Dec. 15, by State Hy. Comn., Trenton, bridge across Musconetcong River, Route 30, Sects. 8 and 9, Warren and Hunterdon Counties. A. L. Grover, ch. clk.; adv. E. N.-R. Dec. 4.

N. J., Blairstown — Dec. 22, by State Hy. Comn., Trenton, bridges, approaches over New York Susquehanna & Western R.R. and Paulin's Kill, on 0.443 mi. Route 8, Sect. 6, Warren Co. A. L. Grover, ch. engr.; adv. E. N.-R. Dec. 4.

O., Cleveland—Dec. 17, by Bd. Comrs. Cuyahoga Co., approaches, deck, pylons, railing, etc., for Lorain-Central Bridge. $2,273,361. Wilbur Watson & Associates, 4614 Prospect Ave., assoc. engrs. Noted July 17.

Ore., Portland—Comrs. Multnomah Co., bids about Jan. 1, rebuilding Hawthorne Ave. Bridge. $155,000. G. W. Buck, Court House, co. engr. Noted Nov. 27.

Tex., Gainesville—Lone Star Gas Co., 1915 Wood St., Dallas, and San Antonio, 1,260 ft. gas pipe line bridge over Red River, near here, to Southwest L. E. Meyers Co., Allen Bldg., Dallas, and Del Rio, $52,234. Noted July 18, 1929 under "Unclassified," Texas.

Wisconsin—Dec. 11, by State and Green Co. Hy. Comns., Berlin, Huron Street Bridge, on S.T.H. 49, S.A.P. 4585, in Berlin.

B. C., Nanaimo—See "Contracts Awarded."

Ont., Chatham—Dec. 15, by W. G. McGeorge, city engr., Bank of Commerce Bldg., superstructure double leaf underneath counter weight bascule bridge, plate girder type, 5th St. Scherzer Rolling Lift Bridge Co., 53 West Jackson Blvd., Chicago, Ill., engr. Noted Nov. 27.

CONTRACTS AWARDED

California—C. H. Purcell, engr., State Hy. Comn., Sacramento, 4 timber bridges west of Wasco, Kern Co., to M. H. Slocum, 2055 Veteran Ave., Los Angeles, $25,120. Noted Nov. 6.

Georgia—See "Streets and Roads."

Indiana and **Kentucky**—J. J. Brown, dir. State Hy. Comn., Indianapolis, Ind., Contr. 1, 5 main river piers A to E (inclusive) limestone, concrete on rock strata underlying river bottom for bridge over Ohio River from Evansville, Ind., to Henderson, Ky., U. S. Rd. 41, stone face design, to Kansas City Bridge Co., 510 Orear-Leslie Bldg., Kansas City, Mo., $543,775—Contr. 2, steel metal work in superstructure main river bridge, roadway paving on metal work from Pier A to Pier E, 10 navigation light fixtures, to American Bridge Co., Frick Bldg., Pittsburgh, Pa., $675,945—Contr. 3, approaches, incl. masonry supports, abutments, piers, rein.-con. on concrete pile found., 42,000 lin.ft. precast concrete piles, 1,850 cu.yd. concrete footings, 5,700 sq.qd. concrete pier shafts and abutments above footings, 150,000 lb. reinforcing steel, to Keith-Riley Constr. Co., Goshen, Ind., $179,500. Contract 4 pending. Grand total $1,399,220. Noted Oct. 9.

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Iowa—State Hy. Comn., Ames, bridges, culverts in Linn Co., to Lundgren-Reis Co., 125 College St., Des Moines, $60,100 — culverts, extensions on Federal Aid Projects 316 and 318, Hamilton Co., to Hirt & Loder, Woolstock, $4,800 and $12,121 respectively—B-253, Marion Co., to E. M. Shoppe, Jefferson, $2,075 — B-675 Marion Co., to G. Jordon, Centerville, $11,949—adding 5 ft. sidewalk to 280 ft. bridge, Dubuque Co., to H. O. Graham, Cedar Rapids, $1,850. Grand total $92,895. Also bridges, culverts in Humboldt Co., to Snyder & Johnson, Humboldt. Noted Nov. 20.

Kentucky — State Hy. Dpt., Frankfort, approaches and rein.-con., substructure bridge over Kentucky River at Chavies, Perry Co., to J. M. Perkins Co., Frankfort, $15,095—three 70 ft. and one 126 ft. span steel superstructure for above bridge to E. R. Mills, Charleston, W. Va., $16,878—bridges, approaches, Nelson Co., to Woodruff & Co., 1046 Barrett St., Louisville, $9,997. Grand total $41,970. Noted July 31 and Nov. 6.

Louisiana—State Hy. Comn., Baton Rouge, to Vincennes Bridge Co., Vincennes, Ind., 6 concrete, steel, timber bridges in Beauregard Parish, $40,677; rein.-con., steel bridge, Catahoula Parish, $86,547; concrete, timber bridge, Allen Parish, $122,483; steel, concrete bridge, timber trestle, Franklin Parish, $49,257; steel, concrete, timber bridge, Franklin and Tensas Parishes, $82,597—to Lakeside Bridge & Steel Co., St. Louis, Mo., and 222 West Adams St., Chicago, Ill., concrete, steel bridge, Jefferson Parish, $77,211. Grand total $458,772. Noted Nov. 26.

Maryland—State Roads Comn., G. C. Uhl, chn., Baltimore, single span rein.-con. girder bridge, approaches, Contr. B-161-43, Baltimore Co., to Harry T. Campbell & Sons Co., Towson, $17,705. Noted Nov. 6.

Maryland—State Roads Comn., Baltimore, G. C. Uhl, chn., structural steel superstructure for bridge Contr. F-161-57, Frederick Co., to Pittsburgh-Des Moines Steel Co., Neville Island, Pittsburgh, Pa., $37,140. Noted Oct. 30.

Pa., Phila.—See "Sewers."

Pa., Pittsburgh—E. G. Lang, dir. P. Wks., City-County Bldg., viaduct, at Horace St., to W. S. Rae, Oliver Bldg., $29,899. Est. $56,000. Noted Nov. 20.

Wisconsin—State and Brown Co., Hy. Comns., Green Bay, Duck Creek Bridge, to Jorgensen Constr. Co., Denmark, $18,557. Noted Nov. 14 Daily.

B. C., Nanaimo — Provincial Government, Victoria, 180 ft. span Howe truss creosoted timber bridge with abutments over Nanaimo River, day labor. $35,000. P. Philip, Dpt. P. Wks., Victoria, engr.

STREETS AND ROADS

BIDS ASKED

Ala., Birmingham—Dec. 30, by City Comn., concrete guttering, sidewalks, 2½ in. asphalt on 6 in. concrete paving 1 block Avenue V, Ensley, 30 ft., $6,060—grading, 2½ in. asphalt on 6 in. concrete paving 10 blocks Madrid Ave., 20 ft., $40,000—grading, 6 in. concrete paving 1 block 21st Place, Alley S., 15 ft., $1,400. A. J. Hawkins, city engr.

Arizona — Dec. 15, by State Hy. Comn., Phoenix, oil processing 16.5 mi. state hy. from Topack to Oatman. W. W. Lane, Phoenix, hy. engr.

California — Dec. 17, by State Hy. Comn., Scaramento, grading, concrete paving 2.8 mi. road between Gaviota and 1 mi. north of Las Cruces, Santa Barbara Co.; grading, asphaltic concrete paving 10.9 mi. road between Pasos Robles and North Boundary, San Luis Obispo Co. C. H. Purcell, ch. engr.

Calif., Los Angeles—Dec. 15, by Bd. Supervs. Los Angeles Co., grading, curbing, guttering, 3 in. oil macadam paving 107,995 sq.ft. C. I. 912-Ocean View Blvd.

Calif., Ventura—Dec. 16, by L. E. Hallowell, clk. Ventura Co., surfacing 2 mi. Eliseo Rd., incl. 4,500 tons asphalt surface mixture; 5 in. oil macadam shoulders on 120,000 sq.ft. Ventura Ave.

Conn., New Haven—Dec. 5, by City, bituminous asphalt paving Winchester, State and George Sts. $25,000. E. Nettleton, city engr.

Florida—Dec. 8, by State Road Dpt., Tallahassee, 8 in. compacted Florida limerock base surfacing 23.69 mi. Projects 806-C and D, Hendry Co. B. M. Duncan, state hy. engr.

Illinois — Dec. 9, by State Dpt. P. Wks. & Buildings, Div. Hys., Springfield, grading 0.17 mi. Route 18, Sect. 23V-A, Bureau Co.—0.4 mi. Routes H and B, 142, Sect. A, Wabash Co. —three 35 ft. and four 24 ft. span steel I-beam bridge, Route H and B, 142, Sect. V, Wabash Co. F. T. Sheets, ch. hy. engr.

Iowa—Dec. 9, by State Hy. Comn., Ames, grading, flumes, paving 9.686 mi. Primary Rd. 7, Audubon Co.—8.368 mi. U. S. Rd. 55, F-323 Clayton Co.—10.255 mi. Primary Rd. 4, F-321 Crawford Co.—5.601 mi. U. S. Rd. 18, P-269 Floyd Co.—0.305 mi. Primary Rd. 161, F-311 Johnson Co.—8.098 mi. U. S. Rd. 169, F-325 and 5.023 mi. U. S. Rd. 169, F-169 Madison Co.—9.493 mi. U. S. Rd. 169, F-326, Union Co. —15.092 mi. U. S. Rd. 161, F-324 and 2.618 mi. Primary Rd. 181, P-578-G, Washington Co. —gravel surfacing 1.9 mi. Primary Rd. from Harper to Rd. 2, P-692 Keokuk Co. C. R. Jones, aud.

Kentucky—Dec. 9, by State Hy. Dpt., Frankfort, grading, drainage structures 7.52 mi. Greensburg-Hardyville Rd., State Project 16-A-G, Green Co.; 3.168 mi. Carlisle-Flemingsburg Rd., State Project 43-B-G, Nicholas Co. B. Johnson, ch. engr.

Louisiana — Dec. 16, by State Hy. Comn., Baton Rouge, grading, gravel surfacing 0.7 mi. emergency levee hy., Waguespack 2 Hy., Project L-3, Route 30, St. James Parish. W. H. Norckauer, hy. engr.

Massachusetts — Dec. 9, by Dpt. P. Wks., State House, Boston, bituminous macadam paving 19,967 ft. hy. Chester and Huntington. A. W. Dean, Dpt. P. Wks., Boston, engr.

Massachusetts — Dec. 9, by Dpt. P. Wks., bitulithic concrete paving 13,516 ft. hy. Chilmark and West Tisbury. A. W. Dean, Dpt. P. Wks., Boston, engr.

Mass., Natick—See "Contracts Awarded."

Michigan—Dec. 9, by R. W. Roberts, resident engr., Saginaw, grading, shaping, drainage structures 1.085 mi. MO73-6-Contr. 2, Saginaw Co., for State Hy. Comn., Lansing.

Michigan—Dec. 10, by R. R. Havens, resident engr., Jackson, grading, shaping, concrete surfacing 1.638 mi. FO38-27 Contr. 4, Jackson Co., 20 ft., for State Hy. Comn., Lansing.

Minnesota—Dec. 9, by State Hy. Dpt., St. Paul, grading, culverts, concrete paving 9.9 mi. S.P. 3-46, Sect. 11, F.A.P. 307-C, S.P. 3-43, Div. A—25.3 mi. S.P. 6-31, Sect. 3, S.P. 3-56, F.A.P. 351-C, S.P. 3-32, F.A.P. 351-B, and S.P. 3-40, F.A.P. 351-A—21.4 mi. S.P. 8-23, Sect. 2, F.A.P. 155—18.7 mi. S.P. 8-26, F.A.P. 266, S.P. 8-28, F.A.P. 26, and S.P. 8-33, F.A.P. 276—11.1 mi. S.P. 15-30, Div. A, F.A.P. 341—13.5 mi. S.P. 15-30, Div. B, F.A.P. 341 and S.P. 14-27, F.A.P. 74—grading 7.6 mi. S.P. 4-49, Sect. 1, F.A.P. 99—16.2 mi. S.P. 9-45, Sect. 5, F.A.P. 38—11.4 mi. S.P. 12-27, Sect. 2, F.A.P. 423-A and S.P. 334—12.2 mi. S.P. 12-27, Sect. 4, F.A.P. 10-B and S.P. 12-27. Noted Nov. 20.

New Jersey — Dec. 22, by State Hy. Comn., Trenton, 9 in. single line rein.-con. paving 3.21 mi. Route 10, Sect. 1 from Hanover to Whippany, Morris Co. A. L. Grover, ch. engr.; adv. E. N.-R. Dec. 4.

New York—Dec. 19, by A. W. Brandt, comr. Hys., Albany, improving roads in Nassau and Westchester Counties; and reconstructing road in Nassau Co.; adv. E. N.-R. Dec. 4.

N. Y., Brooklyn—Dec. 11, by H. Hesterberg, pres. Brooklyn Boro, Boro Hall, asphalt on 6 in. concrete repaving Autumn and Patchen Aves., East 5th and Milford Sts.

N. Y., St. George—Dec. 10, by J. A. Lynch, pres. Richmond Boro, Boro Hall, granite block paving wings Hylan Blvd.

O., Cleveland—See "Bridges."

O., Cleveland—Dec. 10, by Bd. Comrs. Cuyahoga Co., paving Fischer Rd. from Clarence Ave. to Berea Rd. $175,940. F. Williams, Court House, engr.

Okla., Tulsa—Dec. 8, by E. Logan, city aud., grading, 7 in. concrete paving 7,733 sq.yd. Yorktown St. from 21st to Forest Hills Sts. $28,000. H. A. Parker, City Hall, engr.

Okla., Tulsa — Dec. 12, by City Comn., E. Logan, aud., grading, curbing, guttering, sewers, removing old pavement, Class A repaving 130 sq.yd., 7 in. concrete paving 3,687 sq.yd. 5th Ave., Street Improvement Dist. 1064, $13,601; grading, curbing, guttering, sewers, retaining walls, 7 in. concrete paving 7,733 sq.yd. Yorktown Ave., Street Improvement Dist. 1065, $36,117. H. A. Parker, Municipal Bldg., engr.

Pennsylvania — Dec. 18, by State Hy. Dpt., Harrisburg, grading, paving 24 mi. roads in Allegheny, Chester, Delaware, Fayette, Greene, Indiana, Montgomery, Schuylkill and Venango Counties, also rein.-con., steel bridges in Allegheny, Armstrong and Indiana Counties. J. L. Stuart, secy.; adv. E. N.-R. Dec. 4.

Tex., Waco—Dec. 24, by McLennan Co., c/o R. B. Stanford, judge, paving 5 mi. County Rd. from Primm Pl. past Lake Waco to Speegleville Rd. and back to Brewer Lane, 18 ft. M. Hannah, Waco, co. engr.

W. Va., Weirton—Dec. 15, by Hancock Co. Court, New Cumberland. J. F. McHealey, pres., concrete surfacing 2 mi. Cullen Hill Project, 18 ft.

B. C., North Vancouver — See "Contracts Awarded."

B. C., Vancouver—See "Contracts Awarded."

Ont., Toronto—See "Contracts Awarded."

Que., Greenville—Dec. 11, by I. L. Boulanger, deputy minister Dpt. Rds., Quebec City, resurfacing 2.41 mi. Montee vers Lachute.

CONTRACTS AWARDED

Arkansas — State Hy. Comn., Little Rock, grading, drainage structures 3.5 mi. roads in Monroe Co., to J. G. Newkirk, Rowland, $46,106; grading, drainage structures, concrete surfacing 7.5 mi., Union Co., to Altman Rodgers Co., Cotton-Grain Exch. Bldg., Oklahoma City, Okla., $94,563.

Arkansas—State Hy. Dpt., Little Rock, grading, drainage structures, concrete surfacing 7.5 mi. road in Union Co., to Altman-Rodgers Co., Cotton-Grain Exch. Bldg., Oklahoma City, Okla., $94,523. Est. $100,000.

Calif., Bakersfield — Kern Co., grading McKittrick-Belridge Rd., to W. K. McMillan, 2088 Howard St., San Francisco, $41,495.

Streets and Roads (Continued)

Calif., Belmont—Grading, curbing, guttering, oil and screenings on rock macadam paving 700,000 sq.ft., to Union Paving Co., Call Bldg., San Francisco, $196,305. Noted Nov. 20.

Calif., Compton — Grading, concrete paving Golden Ave., to P. Cristich, California Reserve Bank Bldg., Los Angeles, $26,830.

Calif., Los Angeles—Bd. P. Wks., City Hall, grading, 6 in. concrete paving 76th St. and 10th Ave., to T. T. Roach, 2846 Hollenbeck St., $2,219 — grading, curbing, guttering, sewers, water service connections, 4 and 6 in. concrete paving section Sunshine Dr., to A. D. Chalmers, 2925 Knox Ave., $109,645—grading, 6 in. concrete paving 1st alley southerly from Ree St., to A. M. Peck Co., 2918 Denby St., $811. Grand total $112,675.

Calif., Los Angeles—Bd. P. Wks., City Hall, grading, curbing, guttering, removing and installing fire hydrants, 4 in. concrete and 4 in. rock and oil paving Yosemite Dr. and Wiwota St. Impvt. Dist., to J. C. McDonald, Los Angeles, $5,181—grading, curbing, guttering, waterworks, sewers, asphaltic concrete and Natural asphaltic concrete paving Westwood Blvd. between Monica and Pico Blvds., to G. R. Curtis Paving Co., 2440 East 26th St., Vernon, $44,609—grading, curbing, sidewalks, sewers, 4 and 6 in. concrete paving 111th Pl. from Bway. to Figueroa Sts., and grading, curbing, guttering, sewers, sidewalks, street lighting, 4 and 6 in. concrete and 4 in. asphaltic concrete wearing surface paving and repaving 68th St. and Denker Ave. Impvt. Dist., to J. A. Thompson, Los Angeles, $11,130 and $94,270 respectively. Grand total $155,190.

Calif., San Francisco — Bd. P. Wks., A. Hester, secy., grading 100,000 cu.yd. Sect. A-Alemany Blvd., to H. V. Tucker, 300 Vermont St., $38,731.

Calif., Santa Ana—Orange Co., grading, asphaltic concrete paving Laguna Ave., to Griffith Co., Railway Bldg., Los Angeles, $26,395. Noted Nov. 6.

Calif., Santa Barbara—City Council, grading, curbing, sidewalks, concrete paving Padre St., to Hunter & Richardson, 525 East Haley St., Santa Barbara, $39,225.

Calif., Santa Maria—City Council, 4 in. asphaltic concrete paving 94,000 sq.yd., 3 in. oil macadam paving 53,000 sq.yd. Cypress St., to Santa Maria Constr. Co., Santa Maria, $28,575. Noted Nov. 6.

Georgia—State Hy. Comn., East Point, grading, limerock surfacing and 1 bridge, 12.8 mi. Glynn Co., to Broadbent Constr. Co., Ocala, Fla., $260,734 — 12.5 mi. Brantley Co., to MacDougald Constr. Co., 2894 Peachtree St., Atlanta, $257,106—grading, 3 bridges, limerock surfacing 7.882 mi. Grady Co., to H. L. Dunn & Sons, Dawson, $168,499—grading, limerock surfacing 12.435 mi. McRue-Lumber City Rd., Telfair Co., to Campbell Constr. Co., Columbus, $274,252—limerock surfacing 9.1 mi. Eastman-Lumber City Rd., Telfair Co., to Morgan Hill Paving Co., Woodward Bldg., Birmingham, Ala., $190,000—cement paving 9.372 mi. Burke Co., to Whitley Constr. Co., La Grange, $229,139—3 bridges, cement paving 16.3 mi. Richmond Co., to Claussen-Lawrence Constr. Co., Augusta, $408,601—grading 9.05 mi. Mitchell Co., to A. H. Singer, Lafayette, Ala., $35,189—1 bridge, grading, 10.73 mi. De Kalb Co., to Phelps & Milan, Clarkston, $53,344. Grand total $1,876,864. Noted Nov. 13.

Idaho — J. D. Wood, comr. P. Wks., Boise, grading, surfacing 8.676 mi. Payette Hy., Valley Co., to Triangle Constr. Co., 1220 Ide St., Spokane, Wash., $60,941. Noted Oct. 23.

Ill., Greenville—Bond Co., graveling with 6 ft. earth shoulders 21,144 ft. State Aid Route 7A, Sect. 1-15-D, to Louis Rich Constr. Co., 2038 St. Clair Ave., East St. Louis, $30,641.

Iowa—State Hy. Comn., Ames, grading 5.312 mi. Humboldt Co., to F. C. Bretz, Ayrshire, $25,025—4.074 mi. Marion Co., to Sargent & Roth, Keystone, $24,919 — gravel surfacing 3.191 mi. Lyons Co., to Hartzell & Teepell, Early, $2,675—2.501 mi. Montgomery Co., to McDougall Constr. Co., Sioux City, $2,855—12.1 mi. Washington Co., to A. Mulvenna, Hopkinton, $12,300. Grand total $67,774. Rejected bids paving roads in Cass, Grundy, Marion, Monroe and Pottawattamie Counties. Noted Nov. 20.

Kansas — State Hy. Dpt., at Court House, Eureka, grading, culvert 2.829 mi. Neosho Co., to A. L. Cook, Ottawa, $33,384 — 7.876 mi. Greenwood Co. and 10.207 mi. Woodson Co., to Whitney & Teeter Constr. Co., Hutchinson, $49,748 and $90,028 respectively. Grand total $173,160.

Kansas — State Hy. Dpt., at Court House, Hiawatha, concrete surfacing 3.996 mi. Brown Co., to Roberts Constr. Co., Wichita, $104,199; grading, culverts 3.955 mi. Jackson Co., to Dan Scherer Constr. Co., 329 North 18th St., Kansas City, $32,121.

Kansas—State Hy. Dpt., at Court House, Hill City, grading, culverts 10.271 mi. road in Graham Co., to Young & Hall, Maywood, Neb., $80,106.

Ky., Louisville — Dpt. P. Wks., City Hall, improving 41st St., to F. G. Breslin Co., 32nd and Market Sts., $9,970; Michigan Dr., to G. M. Eady Co., Brook and Lee Sts., $6,947. A. A. Kreiger, City Hall, engr.

Louisiana—State Hy. Comn., Baton Rouge, grading, gravel surfacing 7.5 mi. Caney-Toro Hy., Vernon Parish, to J. H. Reeves, Many, $71,880.

Louisiana — State Hy. Comn., Baton Rouge, concrete surfacing 1.8 mi. road, incl. 1 bridge, and 1.7 mi. road, both Winn and Natchitoches Parishes, to Hardaway Contg. Co., Columbus, Ga., $79,615 and $79,615 respectively—10.5 mi. Winn Parish, to Roberts Paving Co., Salisbury, Md., $261,196—10.9 mi. East Carroll Parish, to Sullivan, Lang & Haggerty, Bessemer, Ala., $246,879—12.399 mi. Livingston Parish, to Noonan Constr. Co., Pensacola, Fla., $339,225—9.7 mi. Bienville and Bossier Parishes, to T. S. Clements, Shreveport, $228,777—7.003 mi. De Soto Parish, to J. B. McCrary Co., Citizens and Southern Bank Bldg., Atlanta, Ga., $193,323—14.823 mi. St. John and St. Charles Parishes, to Stevens Bros. & Miller Hutchinson Co., Sellers, $499,346—7.155 mi. Caldwell Parish, to Ziegler Constr. Co., American Trust Bldg., Nashville, Tenn., $173,452—11.1 mi. Terrebone and Lafourche Parishes, to Southern Paving Co., Volunteer Life Insurance Bldg., Chattanooga, Tenn., $195,961—6.736 mi. East Baton Rouge Parish, to Barber Bros. Constr. Co., Baton Rouge, $135,634—grading 2.35 mi. Allen Parish, to Swinney & Coleman, Opelousas, $40,330—grading, drainage structures, graveling 2.084 mi. Rapides Parish, to W. Junkin, Natchez, Miss., $26,151 — grading, drainage structures 6.5 mi. Winn Parish, to Guess & Albrin, Jonesboro, $34,362—grading, gravel surfacing 3.841 mi. East Baton Rouge Parish, to R. E. Merrill, Baton Rouge, $20,661—6.8 mi. Catahoula and La Salle Parishes, to J. J. McKeithan, Grayson, $103,981 — furnishing, delivering 11,665 cu.yd. washed gravel for Oak Grove-Mer Rouge Hy., West Carroll Parish, to Parker Gravel Co., Shreveport, $34,654. Grand total $2,693,162. Grading, drainage structures, gravel surfacing 5.74 mi. hy. in Vermillion Parish, from R. E. Merrill, Baton Rouge, $25,552. Noted Nov. 6.

Massachusetts—Dpt. P. Wks., A. W. Dean, engr., bituminous macadam paving 37,338 ft. hy. Ashfield and Conway, to Kelleher Corp., Turners Falls, $251,667; 8,158 hy. hy. Athol and Orange, to G. Rosse & Son, 10 Oxford St., Leominster, $74,608. Noted Nov. 13.

Mass., Boston—Dpt. P. Wks., J. A. Rourke, comr., sheet asphalt paving Parker St., Roxbury, to M. F. Gaddis, 6 Beacon St., $37,000—sheet asphalt on concrete paving Winship St., Brighton, to A. G. Tomasello & Son, Inc., 250 Stuart St., $22,000—warrenite bitulithic paving Central Ave., Dorchester, to A. Singarella, 22 Tremlet St., Dorchester, est. $25,000—granite block paving E St., South Boston, to C. Repucci & Co., 10 Garden St., est. $25,000 or more.

Mass., Natick—Town, Dpt. P. Wks., reconstructing Walnut St., incl. laying water and sewer pipes, day labor, $25,000 or more.

Mass., Worcester—Dpt. P. Wks., bitulithic paving Donnybrook Rd., Brighton, to S. J. Tomasello, 15 Bay St., Dorchester. Est. $25,000. Noted Nov. 13.

Miss., Greenwood—Grading, curbing, drainage structures, brick on concrete paving Grand Blvd., from Clairborne St. to Park Ave., to Soclay Paving Co., Inc., Provident Bldg., Chattanooga, Tenn., $46,867.

Miss., Gulfport—City Comn., repairing asphaltic concrete resurfacing 15th St. and 25th Ave., to Elmer & Olsen, Nashville, Tenn., $24,500. Noted Nov. 13.

Miss., Vicksburg—City Council, curbing, guttering, concrete paving 11,845 sq.yd. 1st East, 3rd North, Spring, Marshall, Rigley, Central, Grammar, Prospect and China Sts., to V. T. Zollinger, Vicksburg, $29,678. Noted Nov. 13.

Nebraska — Dpt. P. Wks., at office County Clerk, O'Neill, graveling 16.5 mi. S.A.P. 672, Sect. A, Boyd Co., to Carstensen Sand Co., Columbus, $11,730; 15.8 mi. S.A.P. 662, Sects. A and B Loup and Garfield Counties, to L. G. Crownover, Lincoln, $9,781 — grading, graveling, driveways 1.7 mi. S.A.P. 53, Boone Co., to E. W. Nichols, Fairmont, $7,733; bridge on same road, to Diamond Eng. Co., Grand Island, $21,280—fills on same road, to Western Bridge & Constr. Co., 3867 Leavenworth St., Omaha, $8,667. Grand total $59,191. Noted Nov. 17.

Nebraska—Dpt. P. Wks., Lincoln, to Yant Constr. Co., 1146 Omaha Natl. Bank Bldg., Omaha, graveling 6.5 mi. Saline Co., $18,234; 3 mi. Saline Co. $8,317; 9.3 mi. Boyd Co. $9,287; 5 mi. Boyd Co. $3,983; to Abel Constr. Co., 308 Terminal St., Lincoln, graveling 2 mi. Saline Co. $2,699; graveling 10.6 mi. Gage Co. $4,237; 12 mi. Gage Co. $5,109; 8 mi. Gage Co. $3,095; 13 mi. Jefferson and Gage Counties $14,592—to Koehler Constr. Co., Sterling, 5.3 mi. Dawes Co. $8,903; 13.1 mi. Dawes Co. $8,716; 3.8 mi. Dawes Co. $4,765—to F. L. Busche, 4118 North 30th St., Omaha, 12 mi. Fillmore Co. $14,651; 2 mi. Custer Co. $2,033—to Keim Constr. Co., Tecumseh, culverts on Pawnee City-Steinauer Rd., Pawnee Co. $1,405—to Central Bridge & Constr. Co., Wahoo, maintenance graveling 3.2 mi. Lancaster and Gage Counties $1,277 — to L. G. Crownover, Lincoln, 13 mi. Sarpy Co. $3,091; 9.3 mi. Sioux Co. $17,559 — to Roberts Constr. Co., 404-5 1st Natl. Bank Bldg., Lincoln, 5.9 mi. Polk Co. $2,288; 4.4 mi. Furnas Co., $2,305—to J. F. Bowen, Beverly, 6 mi. Chase Co. $1,759—to E. L. Marrs, Omaha, grading 11.3 mi. Keith Co., $34,995—to R. R. Knight, Lincoln, grading 7.3 mi. Valley Co. $10,222—to Diamond Eng. Co., Grand Island, culverts $4,194; driveway culverts $278; bridge $3,930; all in Valley Co.—to Gavenman-Friedel Constr. Co., Omaha, bridge in Sarpy Co. $1,434—to R. D. McClanahan, Scottsbluff, grading 9.3 mi. Sioux Co. $35,117—to A. C. Smith, Scottsbluff, culverts $22,189, driveway culverts $79, both in Sioux Co.—to Nebraska Culverts & Mfg. Co., Wahoo, culverts on Lincoln-North Bend Rd., Saunders Co., $851—to Steel & Olinger, Sidney, grading 8 mi. Banner Co. $9,876—to Western Bridge & Constr. Co., 3867 Leavenworth St., Omaha, culverts $8,966, 4 bridges $5,921, all in Banner Co. Grand total $274,986. Noted Oct. 9.

N. H., Nashua—City, bituminous macadam paving, Bowers, Marshall, Temple and Canal Sts. $100,000. Owner builds.

N. Y., Brooklyn—H. Hesterberg, pres. Brooklyn Boro, Boro Hall, to Grimm Contg. Co., 85-38 107th St., Richmond Hill, grading Bradford St., $2,045; Stanley Ave., $2,546; Van Sicklen Ave., $4,123—to Concrete Co., Metropolitan Ave., East 2nd St., $6,150—to C. R. Contg. Co., 2266 Gravesend Ave., 14th Ave., $2,297; 27th Ave., $2,424—to B. Turecamo, New Dropsey Lane, asphalt paving East 49th St., $7,972; 97th St., $7,584—to Uvalde Asphalt Paving Co., Metropolitan Ave., Van Sicklen Ave., $13,336—to F. Vacaro, sewers in Bay Ave., $1,272; East 51st St., $1,685. Grand total $51,534. Noted Nov. 13.

N. Y., Long Island City—G. U. Harvey, pres. Queens Boro, Queens Subway Bldg., to Uvalde Asphalt Paving Co., Metropolitan Ave., Brooklyn, asphalt paving 42nd Ave., $18,877; 79th St., $13,401—to Borough Asphalt Co., 1301 Metropolitan Ave., Brooklyn, 99th St., $10,118; 83rd St., $9,901; 45th Ave., $9,923—to Carbloc Paving Co., Stagg St., Brooklyn, 40th Rd., $16,390—to W. P. McDonald, 7 Lawrence St., Flushing, 14th Ave., $35,921 — to Sprague Constr. Co., Alemeda St., Belle Harbor, Rockaway Beach Blvd., $35,280—to Flushing Contg., 59 Taaffe Pl., Brooklyn, granite block paving Grand St., $135,370—to P. K. Kelly Contg. Co., 60-09 Woodside Ave., Woodside, $6,540—to Peace Bros., 57 North Lawrence St., Flushing, Elmhurst Ave., $2,157. Grand total $293,878. Noted Nov. 13.

N. Y., St. George—J. A. Lynch, pres. Richmond Boro, Boro Hall, grading Ridgewood Ave. and relief drain in Baker Pl., to Vanbro Constr. Co., 24 Elizabeth St., West New Brighton, $6,698 and $1,815 respectively. Noted Nov. 6.

O., Columbus—Franklin Co., grading, brick paving 4 mi. 60 ft. sect. and bituminous macadam paving 4 mi. 30 ft. sect. Olentangy Blvd., to A. W. Burns Constr. Co., 424 Woodland Ave., $52,100. Noted Nov. 20.

Okla., Beaver — G. Stephenson, city clk., grading, paving 7 blocks Douglas and 2nd Sts., to S. S. Strong & Sons, Beaver, $67,960. Est. $75,000.

Okla., Oklahoma City—M. Peshek, city clk., grading, paving 5 blocks South 44th St. from Shields to Lile Sts., 30 ft., to Connelly Bros., El Reno, $15,083 est. $25,000; widening 6 blocks California Ave. from Walker to Western Sts., 70 ft., to Western Paving Co., Petroleum Bldg., $41,137 est. $45,000. Noted Nov. 13.

Pa., Duquesne — City, J. A. Hughes, supt. Streets & P. Impvts., stone curbing, brick on 8 in. concrete paving Kennedy Ave. and South 1st St., to McDonough & O'Toole, 514 Climax St., Pittsburgh, $75,747. Noted Nov. 13.

Pa., Phila.—See "Sewers."

Pa., Phila.—Bureau Hys., Dpt. P. Wks., A. Murdock, dir., City Hall Annex, to M. Masse, 3936 North Reese St., grading Merrimac Rd. from Cresson to Dobson Sts. $3,900; Shelborne St. from Tyson St. to point 230 ft. north and Tyson St. from Shelborne to Oakley Sts. $3,005—to Municipal Eng. Co., Washington Square Bldg., asphalt paving (assessment work) Greenway St. from 60th to Salford Sts. $3,207; redressed granite block repaving Water St. from Pine St. to Dock $10,210 — to Union Paving Co., Broad and Stiles Sts., asphalt paving (assessment work) Josephine St. from Knorr to Unruh Sts. $2,901; Lincoln St. from Wayne to Carpenter Sts. $57,701; Taber St. from Adams to Harrison Sts. $14,634; Unruh St. from Keystone to Torresdale Sts. $9,738; asphalt repaving Wayne St. from Bristol to Roberts Sts. $12,869; country road improving Friendship St. from Rising Sun to Shelborne Sts. $3,937—to Eastern Asphalt Co., Penna. Bldg., redressed granite block repaving Glenwood St. from 5th to 6th Sts. $8,791 — to Montgomery Paving Co., Harrison Bldg., country road improving Tyson St. from Shelborne to Oakley Sts. $2,599—to M. and J. B. McHugh, 892 North Markoe St., furnishing, laying water pipe in Olney Ave. from Ogontz Ave. to 20th St. (assessment work) $4,096. Grand total $137,944. Noted Nov. 13.

Pa., Pittsburgh—E. G. Lang, dir., P. Wks., City-County Bldg., grading, curbing, paving Horace St. from Liberty Bridge approach to Boulevard of Allies, to M. O'Harron Co., South 1st and McKean Sts. $31,412. Est. $51,000. Noted Nov. 20.

Tex., Beaumont — City, c/o R. Edmonds, secy., Duraco on concrete permanent paving Euclid Ave. and Avenue A, to Scott Shambaugh, 1401 Dowling St., Houston, $91,776. Est. $100,000. Noted Oct. 30.

Tex., Fort Worth—City, c/o O. E. Carr, mgr., warrenite bitulithic paving Henderson St., to West Texas Constr. Co., 501 Rosedale St., $34,891.

Utah — State Rd. Comn., Salt Lake City, grading, graveling 41.397 mi. Lincoln Hy., Tooele Co., to Dodge Bros., Inc., Fallon, Nev., $201,740. Est. $264,275. Noted Nov. 17 Daily.

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Streets and Roads (Continued)

Washington—S. J. Humes, dir. Hys., Olympia, grading, graveling 2.837 mi. Grays Harbor Co., to J. S. Pederson, Emunclaw, $32,195—3.182 mi. Klickitat Co., to Morrison Knudson Co., 1307 Old Natl. Bank Bldg., Spokane, $32,565—2.18 mi. Snohomish Co., to Sigismund & Co., Inc., Everett, $5,258—7.605 mi. Yakima Co., to C. L. Creelman, 1079 25th Ave. N., Seattle, $51,561. Grand total $121,579. Noted Oct. 30.

Wisconsin—State and Taylor Co. Hy. Comns., 213 South Barstow St., Eau Claire, grading 2.748 mi. Taylor Co., to Carl & J. Theiler, Black River Falls, $29,322. Noted Oct. 16.

Wyoming — State Hy. Comn., Cheyenne, surfacing 10.77 mi. Midwest-Kaycee Rd., to T. G. Tobin Constr. Co., Rawlins, $143,970—10.588 mi. Moorcroft-Carlile Rd., to Watt Bros., Buffalo, $36,048—13.916 mi. Cheyenne-Pine Bluffs Rd., to R. Statz, Hillsdale, $31,707—crushing and loading 211,067 tons gravel, to Threet Bros., Lovell, $128,200. Grand total $340,015. Noted Nov. 20.

B. C., North Vancouver—Clearing, grubbing, grading streets and lanes, day labor under Federal Assisted Unemployment Scheme. $65,000. C. S. Hanes, city engr.

B. C., Vancouver—For 7.4 mi. concrete sidewalks, to G. W. Lidingham, Oak and Goodmurphy Sts., $27,373.

B. C., Vancouver—City, 4 to 6 ft. sidewalks, force account, $55,000. Bids Nov. 28 for balance by contract, $54,668. Total $109,668.

Ontario — Dpt. P. Hys., Parliament Bldgs., Toronto, concrete paving 5 mi. St. Thomas-Port Stanley Rd., to Towland Constr. Co., Douglas St., Guelph—asphalt paving 1 mi road west of New Toronto, to Warren Bituminous Paving Co., 74 University Ave., Toronto—grading, culverts 5 mi. Norwood Diversion, to Rayner Constr. Co., 159 Bay St., Toronto, 1½ mi. Bluth Diversion, to Cardiff & McNabb, R.R. 1, Brussels 8 mi. Brighton, northerly, to York Constr. Co., R.R. 1, Scarboro Jct.—concrete work, Severn Bridge, to C. B. Stewart, Port Dover. Est. $250,000. Noted Oct. 9.

Ont., Kitchener—Asphalt paving Mary and Pine Sts., to Standard Paving Co., Central Chambers, Ottawa; 5 ft. concrete sidewalk on Luella St., to A. Damman & Sons, 202 Weber St. E. Est. $25,000.

Ont., Toronto—City, asphalt paving Queens Quay, to Kilmer & Barber Ltd., Harbor Bldg., $8,266—Briar Hill Ave., to Godson Contg. Co. Ltd., 203 Richmnod St. W., $9,741—Gleke Rd., day labor, $4,087—concrete paving 3 lanes, to Certified Concrete Co. Ltd., 6 Endean Ave., $4,382—2 lanes, to L. P. Acri, 28 Grove Ave., $5,109 Grand total $31,585.

Ont., Winsdor—Essex Co. Council, J. J. Newman, engr., Davis Blk., concrete paving Lauzon Rd., to Cleary, Dean & Nicoli, 1307 Highland Ave., $32,000.

EXCAVATION, DRAINAGE, IRRIGATION, LEVEES, RIVER AND HARBOR

PROPOSED WORK

Ind., Marion — City levee construction, beautification river banks, $100,000. C. D. Smith, Marion, engr.

Ind., Vincennes—City new levee for flood protection. $137,000. R. E. Lind, Vincennes, engr.

N. J., Long Branch—Bd. City Comrs., City Hall, steel, stone jetties, foot of Pavillon Ave. $25,000. O. R. Seaman, Bway., engr.

Okla., Luther—Oklahoma Co. (Oklahoma City) Squaw Creek Drainage District near here. $30,000. R. S. James, Court House, Oklahoma City, engr.

Okla., Muskogee—Muskogee Co. preliminary plans Dirty Creek D.D. 3. $60,000. T. P. Clonts, Muskogee, engr.

Okla., Witcher—Oklahoma Co. preliminary plans drainage district known as Deep Fork D.D 14, near here. $60,000. R. S. James, 519½ West Main St., Oklahoma City, engr.

Ont., Orillia—Town, cleaning out Mont Slaven Drain, $16,000; constructing drains in South Ward, $15,000. R. Starr, Orillia, engr.

Texas—Cameron, Willacy and Hidalgo Counties or United States and Mexican Governments, master irrigation district for system of probably 4 dams for storage water for irrigation and power puposes. $10,000,000.

BIDS ASKED

Ind., Ft. Wayne—Dec. 9, by A. W. Grosvenor, comr. Constr. at Allen Co. Surveyors Office, Court House, constructing, repairing Hamm Joint Interstate Ditch or Interceptor, incl. 2 culverts, 5,000 lin.ft. 6- to 15-in. clay drain tile, 36 catch basins, 235,127 cu.yd. excav.

Louisiana—See "Streets and Roads."

La., Hammond — Dec. 19, by Bd. Comrs. Tangipahoa Parish D.D. 1, gravity drainage system, incl. earth excav. in drainage canals, clearing, cleaning natural stream channels, constructing rein.-con., timber bridge. $50,000. E. G. Freiler, Hammond, engr. Noted Oct. 30 under "Ponchatula."

La., Hammond — Dec. 22, by Bd. Comrs. Tangipahoa D. D. 1, dredging 500,000 cu.yd. excav., 180 acres clearing. E. G. Frieler, engr.

La., New Orleans — Dec. 8, by Bd. Comrs. Port of Orleans, New Orleans Court Bldg., hydraulic dredge fill, incl. 900,000 cu.yd. excav., on Gulf, Mobile & Northern R.R. property.

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Mass., Boston — Dec. 5, by Dpt. P. Wks., dredging 10,000 cu.yd. at Calf Pasture Pumping Station, Dorchester. J. A. Rourke, comr.

New Jersey—Dec. 15, by State Hy. Comn., Trenton, constructing embankment from Pier 88 near Passaic River to Pier 98, south of Lincoln Hy., Sects. 7 and 8, Route 25, connecting link and Sect. 7a, (Ramp) from hy. along Morris Canal to point west of Blanchard St., Newark, Essex Co., Contr. 43. A. L. Grover, ch. clk.; adv. E. N.-R. Dec. 4.

O., Cleveland—Dec. 6, by Bd. Comrs. Cuyahoga Co., retaining wall along Chagrin River, on Willson Mills Rd., incl. 2,300 cu.yd. earth excav., 1,200 cu.yd. mass concrete, 130,000 lb. steel reinforcing, 6,000 cu.yd. embankment, 1,150 sq.yd. waterproofing, $43,790. F. Williams, Court House, engr.

Okla., Cordell—Dec. 8, by F. Thompson, clk. Washita Co., Calvary Creek D. D. 1, incl. 300,000 cu.yd. excav. $30,000. F. Ford, Cordell, engr.

Wash., Chelan — Dec. 19, by Howard Flat Irrigation Dist., complete irrigation system, incl. concrete pump house, two 700 hp. centrifugal pumps, 64,531 lin.ft. 4- to 30-in. pipe, valves, fittings, hydrant. W. T. Batcheller, Inc., 1903 Exch. Bldg., Seattle, engrs. Noted Aug. 14.

Quebec — Dec. 9, by J. W. Pugsley, secy. Dpt. Rys. & Canals, Ottawa, Ont., widening, deepening Grenville Canal, Argentenill, $50,000. C. Dubuc, Ottawa, Ont., engr.

CONTRACTS AWARDED

Ala., Birmingham—A. J. Hawkins, city engr., widening, straightening, deepening ¼ mi. Sect. 8 Village Creek, to Sutton Bros., 1113 4th Ave. W., $53,730. Noted Nov. 6.

Ariz., Phoenix — Majestic Groves, Inc., Phoenix, 6,500 lin.ft. 16 in. and 10,000 lin.ft. 12 in. cement pipe for irrigation piping system, to Phoenix Concrete Pipe Constr. Co., Phoenix, $11,137. Est. $26,000. Noted Nov. 27.

La., Hammond—Bd. Comrs. Gravity D. D. 2, Tangipahoa Parish, gravity drainage system, incl. clearing and cleaning natural stream channels, to Boone & Webster, Hammond, $120,000.

Mass., Quincy—Dpt. P. Wks., Boston, A. W. Dean, engr., dredging channel and basin at Hough's Neck, 30,000 cu.yd. scow measure, to Bay State Dredging & Contg. Co., 62 Condor St., East Boston, $14,720. Noted Nov. 13.

Neb., Lincoln—Bd. Trustees Sanitary Dist. 1, Lancaster Co., W. C. Framp, secy., 427 Bankers Life Bldg., to Martin-Day Co., Lincoln, deepening, widening Salt Creek, 317,000 cu.yd. channel excav. at $0.069 per cu.yd., 1,520 cu.yd. side ditch excav. $0.10, 3,000 cu.yd. excav. to be hauled $0.10, two 24 in. culverts complete with headwalls using concrete $400, corrugated $373.

O., Greenville—Darke Co., enlarging channels Greenville Creek-Mud Creek Drainage Ditch, to facilitate drainage and improve runoff from city sewers, 170,000 cu.yd. excav., to C. Erickson, Pinconing, Mich., $27,256. Est. $44,000.

Wash., Longview — Long-Bell Lumber Co. raising dyke, to H. T. Beblect, Longview, $30,263.

Ont., Erieau—Hawrich Twp., flood prevention walls, embankments, land reclamation, to Chambers, McQuigge & McCaffrey Ltd., Port Arthur, $93,755.

Public Bond Elections

Coming Bond Elections

Waterworks Ext.—Okla., Oklahoma City, Dec. 15, $500,000.

Waterworks — Okla., Washington, Dec. 9, $17,500.

Sewerage System—Miss., Cleveland, $200,000.

Sanitary and Storm Sewers and Disposal Plant—Okla., Oklahoma City, Dec. 15, $2,725,000.

Incinerator—Oklahoma City, Dec. 15, $240,000.

Viaducts—Oklahoma City, Dec. 15, $150,000.

Light and Power Plant—Okla., Cushing, Dec. 2, $300,000.

Power Plant—Okla., Hominy, $150,000.

Court House—Okla., Chickasha, Grady County, Dec. 22, $300,000.

City Hall, Convention Hall, Fire Sta.—Oklahoma City, Dec. 15, $1,800,000.

Hospitals and Institutions — Mo., St. Louis, April, $15,000,000.

Schools — Tex., San Antonio, Dec. 18, $1,015,000.

Bonds Voted

Sewers — La., Baton Rouge, $290,000. L. J. Voorhees, Engr.

Irrigation—Tex., Cameron County, Water Impvt. Dist. 18, $480,000.

School—N. Y., South Onondaga, $185,000.

Bonds Defeated

Sewers—Okla., Maysville, $25,000.

Swimming Pool—Ia., Boone, $25,000.

Airport—Tex., San Angelo, $75,000 (election postponed indefinitely).

FEDERAL GOVERNMENT

PROPOSED WORK

Ark., Stuttgart—POST OFFICE—Treas. Dpt. at office Superv. Archt., 1 or 2 story, 150 x 175 ft. post office, 3rd and Maple Sts.

Ariz., Tucson—HOSPITAL—Vet. Bu., Arlington Bldg., U. S. Veteran's Hospital Annex.

Fla., Jacksonville — POST OFFICE — Treas. Dpt. at office Sup. Archt., plans by H. J. Klutho, 2030 Main St., U. S. Post Office. Noted July 17.

Ill., Rock Island—REPAIRING—U. S. Eng., repairing wing and closing dams on Mississippi River between Mo. 230 and 315.

Louisiana—LEVEES—U. S. Eng., Vicksburg, Miss., 1,329,000 cu.yd. levees in Mississippi River.

Mass., Boston—POST OFFICE—Treas. Dpt. at office Superv. Archt., bids latter part month, post office, Post Office Sq. Noted May 23, 1929.

Mass., Lawrence—POST OFFICE—Treas. Dpt. at office Sup. Archt., bids in January, post office addition, 321,000 cu.ft. floor space. Noted Aug. 21.

Miss., Aberdeen—POST OFFICE—Treas. Dpt. at office Sup. Archt., rein.-con., brick, steel addition.

N. H., Claremont — POST OFFICE — Treas. Dpt. at office Sup. Archt., U. S. Post Office.

R. I., Warren—POST OFFICE—Treas. Dpt. at office Sup. Archt., U. S. Post Office.

R. I., Woonsocket—POST OFFICE—Treas. Dpt. at office Sup. Archt., U. S. Post Office addition.

Utah, Salt Lake City—DISTRIBUTION SYSTEM—U. S. Eng., pipe line distribution system at Fort Douglas Reservation.

Wash., Seattle—HOSPITAL—Treas. Dpt. at office Sup. Archt., U. S. Marine Hospital. J. Graham, Dexter Horton Bldg., and Bebb & Gould, Hoge Bldg., assoc. archts.

BIDS ASKED

Colo., Canon City—POST OFFICE—Dec. 29, by Treas. Dpt., at office Sup. Archt., U. S. Post Office. Noted Nov. 7, 1929.

Conn., New London—ACADEMY—Dec. 19 (extended date), by Treas. Dpt, at office Sup. Archt., academy buildings, stadium, equipment, appurtenances and outside services at U. S. Coast Guard Academy. Noted Nov. 13.

D. C. Wash.—GRANITE BLOCKS—Dec. 30, at office Executive Officer Arlington Memorial Bridge Comn., Navy Bldg., granite blocks for pedestals of 4 equestrian groups to be erected on Bridge Plaza at east end Arlington Memorial Bridge; adv. E. N.-R. Dec. 4.

D. C., Wash.—TRUCKS—Dec. 10, by A. L. Flint, genl. purch. agt. Panama Canal, garbage trucks, truck dump bodies, water meters, steel racks, automobile lifts, air stands and water-tapping machines, electric motors, etc., Schedule 2609.

Florida —DREDGING — Dec. 16, by U. S. Eng., Jacksonville, 605,000 cu.yd. in Indiana River portion Intracoastal Waterway from Jacksonville to Miami; adv. E. N.-R. Dec. 4.

Ind., Kokomo—POST OFFICE—Dec. 16, by Treas. Dpt. at office Superv. Archt., general contract 50 x 100 ft. post office. Noted Sept. 25.

Kan., Wolcott—REVETMENT—Dec. 17, by U. S. Eng., 707 Postal Telegraph Bldg., Kansas City, 6,600 lin.ft. standard revetment in Missouri River, Weaver's Bend, about 1.6 mi. from here.

Me., Portland—COURT HOUSE—Dec. 5, by Treas. Dpt. at office Superv. Archt., preliminary excavation for altering and extending U. S. Court House.

Mass., Boston—PIPE—Dec. 11, by Bureau Supplies & Accounts, Navy Dpt., Wash., D. C., brass and copper pipe to Boston Navy Yard.

Mass., Fall River—POST OFFICE—Dec. 11 (extended date), by Treas. Dpt. at office Sup. Archt., 2 story, basement, granite post office. Noted Nov. 27.

Missouri—REVETMENT—Dec. 20, at U. S. Eng., St. Louis, 6,000 lin.ft. bank revetment at Bonhaomme Bend, Mile 39-43, Missouri River; adv. E. N.-R. Dec. 4.

Nev., Boulder City—PUMPING UNITS—Dec. 10, by Bureau Reclamation, Denver, Colo., 3 pumping units to pump water in 3 stages, 1st unit to pump river to settling basin, 2nd unit settling basin to filter beds and 3rd unit filter beds to tank, incl. 6 mi. pipe, filtration plant, settling basins.

Nev., Las Vegas—ROAD—Jan. 7, at office Bur. Reclamation, constructing 7 mi. hy. from Boulder City to Hoover dam site, Boulder Canyon Project, Arizona-California-Nevada, 25-30 mi. southeast of here; adv. E. N.-R. Dec. 4.

N. Y., Iona Island — BUILDING IMPROVEMENTS—Spec. 6317—Dec. 23, at office P. Wks. Officer, 3rd Naval Dist. Headquarters, Washington and Christopher Sts., New York, improving Buildings 504 and 508, Naval Ammunition Depot; adv. E. N.-R. Dec. 4.

N. Y., Mineola—QUARTERS—Dec. 29, by Con. Q. M., 13 double sets non-commissioned officers' quarters; adv. E. N.-R. Dec. 4. Noted Nov. 13.

Okla., Oklahoma City—POST OFFICE—Dec. 23, by Treas. Dpt. at office Sup. Archt., 8 story, basement, brick, steel addition to U. S. Post Office, Harvey St.

Pa., Lewisburg—PENITENTIARY—Dec. 30, by Treas. Dpt. at office Sup. Archt., federal penitentiary, west bank Susquehanna River, Union Co. Appropriation $3,850,000. A. Hopkins & Associates, 415 Lexington Ave., New York, archts. E. E. Seelye, 101 Park Ave., New York, structural engr. L. G. Hobbell, 522 5th Ave., New York, mechanical engr. Noted Oct. 9.

Federal Government (Continued)

Pa., Pittsburgh—MANEUVER BOATS—Dec. 10, by U. S. Eng. Office, 3 steel maneuver boats; adv. E. N.-R. Dec. 4.

Texas—CANALS—U. S. Eng., Galveston, bids about Dec. 15, 110 mi. from Galveston to Port Arthur; dredging 40 mi. canal from Port Arthur to Chambers Co. line. Noted Oct. 30.

Tex., Randolph Field—CLUB—Dec. 22, at office Con. Q. M., 2 enlisted men's club buildings; adv. E. N.-R. Dec. 4.

CONTRACTS AWARDED

Florida—DREDGING—U. S. Eng., Jacksonville, 1,819,000 cu.yd. 75 ft. wide and 2,425,000 cu.yd. 100 ft. wide in Indian River, Sect. St. Lucie Inlet, Malabar, Jacksonville, to Clark Dredging Co., 367 S. W. North River Dr., Miami, $254,814. Noted Oct. 16.

Kan., Fort Riley—QUARTERS—Con. Q. M., 9 sets non-commissioned officers quarters, to Busboom Bros., Fairbury, Neb., $125,670. Noted Oct. 9.

Minn., Fort Snelling (br. St. Paul)—EXCAVATING—U. S. Eng., St. Paul, realigning channel Mississippi River, above here, to Kremer & Hog, 340 Gateway Bank Bldg., Minneapolis, at $0.22 per cu.yd. Noted Nov. 13.

Mo., Kansas City — EXCAVATING — Treas. Dpt. at office Sup. Archt., excavating for U. S. Post Office, to G. H. Shartzer, North Irwin St., Dayton, O., $36,941. Noted Nov. 20.

Mo., Sibley—CLUMP DIKES—U. S. Eng., Post Telegraph Bldg., Kansas City, standard pile clump dikes in Jackass, Fishing River and Fire Creek Bends Missouri River, to W. A. Ross Constr. Co., 26th and Summit Sts., Kansas City, $390,379. Noted Oct. 16.

N. J., Metuchen—QUARTERS—Con. Q. M., 5 non-commissioned officers' quarters at Raritan Arsenal, to Alliance Constr. Co., $39,486. Noted Oct. 23.

RAILWAYS

PROPOSED WORK

Oklahoma and **Kansas**—Missouri Pacific R.R. Co., Missouri-Pacific Bldg., St. Louis, Mo., E. A. Hadley, ch. engr., automatic block signal system from Sugar City, Colo. to McCracken, Kan. $300,000. **Maturity in 1931.** Noted Mar. 6.

Washington—Bd. P. Wks., Seattle, rejected bids extending municipal street railway on Beacon Ave., Seattle. $60,000. Will readvertise. R. H. Thomson, city engr. Noted Nov. 24 Daily.

British Columbia—Canadian Pacific Ry., J. M. R. Fairbairn, ch. engr. system, Montreal, Que., bids in December, new line along shore of Skama Lake from Penticton to Oliver. $640,000.

BIDS ASKED

Pennsylvania — See "Unclassified under Baden."

New Jersey—Dec. 26, at office J. T. Congleton, dir. Dpt. P. Affairs, City Hall, Newark, portion city railway, known as Sect. 3, in bed Morris Canal, from Washington St. to New St., Newark; adv. E. N.-R. Dec. 4.

CONTRACTS AWARDED

West Virginia—Chesapeake & Ohio R.R. Co., Richmond, Va., C. W. Johns, ch. engr., enlarging and double tracking Stretchers Neck Tunnel at Prince, to Carpenter, Major Bros. Co., Inc., Clifton Forge, Va., $1,084,000; enlarging White Sulphur Tunnel at White Sulphur, to Walton Constr. Co., Roanoke, Va., $118,500; extension of 6 stalls of roundhouse at Handley, to W. P. Thurston Co., Inc., 301 South 4th St., Richmond, Va., $46,287. Grand total $1,248,787.

SUBWAYS AND TUNNELS

PROPOSED WORK

Ont., Toronto—City and Canadian Pacific Ry., J. M. R. Fairbairn, ch. engr. system, Montreal, Que., soon takes bids subway, Landsdowne Ave., above Royce Ave. at railroad tracks, incl. concrete founds., abutments, retaining walls, steel spans, paving. $300,000. R. C. Harris, city engr.

GRADE CROSSINGS

PROPOSED WORK

Ill., Chicago—Bd. Comrs. Cook Co., County Bldg., plans 1 mi. grade separation, incl. 271 ft. viaduct, 50 ft. 6 in. roadway, two 5 ft. sidewalks, approaches or filled roadway, on Harlem Ave. from 63rd to 71st Sts., over 9 tracks of Belt R.R. and 2 tracks Chicago Clearing Companies R.R. G. A. Quinlan, 221 North La Salle St., engr.

New York—Pub. Serv. Comn., Albany, approved 93 railroad grade crossing elimination projects during 1931. $33,887,700.

O., Bedford—Pennsylvania R.R., T. J. Skillman, ch. engr., Phila., Pa., and Bd. Comrs. Cuyahoga Co., Cleveland, grade crossing elimination, Northfield Rd. $400,000. A. M. Felgate, Court House, Cleveland, co. bridge engr.

Okla., Oklahoma City—City preliminary plans grade crossing under Santa Fe tracks at 6th St. $25,000. G. F. Brown, City Hall, engr.

Ont., Sudbury — City and Canadian Pacific Ry., J. M. R. Fairbairn, ch. engr. system, Montreal, Que., bids early in January, steel, concrete subway under tracks, Lorne St. $100,000. F. Barber, engr., 45 Jarvis St., Toronto, is preparing plans.

BIDS ASKED

N. Y., White Plains—Dec. 15, by Westchester Co. Park Comn., 72 West Pondfield Rd., Bronxville, 2 undercrossings at Grant Ave. and Orchard St., Central Westchester Parkway and connections. J. Downer, Bronxville, ch. engr.; adv. E. N.-R. Dec. 4.

CONTRACTS AWARDED

Colo., Florence—State Hy. Dpt., Denver, railroad overpass on State Hy. 6, east of here, to Mountain States Constr. Co., Central Blk., Pueblo, $57,591.

Ohio — R. N. Waid, dir. Hys., Columbus, underground grade separation, paving 0.483 mi. Sect. D and 1 Springfield-Urbana Rd., Clark Co., to L. C. Love, Sidney, $43,840—underway roadway, brick paving 0.18 mi. Sect. Canal Winchester, Columbus-Lancaster Rd., Franklin Co., to Wm. Loomis & Son, Logan, $47,527—underpass for grade separation, brick paving 0.208 mi. Sect. E Columbus-Lancaster Rd., Franklin Co. to A. W. Burns Co., 424 Woodland Ave., Columbus, $34,425 — overhead grade separation, brick paving 0.17 mi. Sect. 1 Toledo-Angola Rd., Lucas Co., to G. L. La Boiteaux, 4926 Lewis St., Toledo, $21,562—grade crossing elimination, concrete paving 0.715 mi. Sects. G and F-2, Columbus-Washington Rd., Madison Co., to Steelhorn & Beighler, Columbus, $123,468. Grand total $270,822. Noted Nov. 13.

DAMS

PROPOSED WORK

Ark., Paris—See "Waterworks."

PIERS AND WHARVES

PROPOSED WORK

R. I., Providence—DOCK and WHARF—City Bd. Contr. & Supply, city dock extension, Field's Point Sect., to exceed $25,000; rebuilding timber pile wharf, Henderson St., $25,000. S. F. Nolan, City Hall, engr.

AIRPORTS

PROPOSED WORK

Calif., San Francisco — Electrically driven centrifugal pump, appurtenances for Mills Field Municipal Airport. M. M. O'Shaughnessy, city engr.

Okla., Pauls Valley—Preliminary plans municipal airport. $25,000. H. Harris, Pauls Valley, engr.

Tex., Galveston — City, municipal airport. Beretta-Stiles Co., Natl. Bank of Commerce Bldg., San Antonio, engrs.

Tex., San Angelo—City, c/o E. E. Lowrie, San Angelo, municipal airport. $75,000 bond election for same postponed indefinitely.

BIDS ASKED

Conn., New Haven — New Haven Airport, Morris Cove, taking bids grading, land work at airport. $25,000. Westcott & Mapes, 139 Orange St., engrs.

GRAIN ELEVATORS

PROPOSED WORK

N. D., Grand Forks—GRAIN ELEVATOR—North Dakota Terminal Elevator Assn., c/o H. A. Bronson, 1,000,000 bu. terminal elevator. $250,000.

POWER AND LIGHTING

PROPOSED WORK

Colorado—See "Power Plants."

Que., Montreal—City, underground lighting in parks. $150,000.

BIDS ASKED

Calif., Beverly Hills—Dec. 16, by City Council, furnishing, installing 108 ornamental street lighting standards in Santa Monica Ave.

Ont., Rockliffe—See "Contracts Awarded."

CONTRACTS AWARDED

Calif., Los Angeles—Bd. P. Wks., City Hall, ornamental lighting and underground systems on Western Ave. from Jefferson Blvd. to Santa Barbara Ave., to Electric Lighting Supply Co., 216 West 3rd St., $38,200.

Mass., Boston — City, Traffic Comn., 154 Berkley St., automatic control signal system, Unit 2, to Crouse-Hinds Co., Wolf St. and 7th St. N., Syracuse, N. Y., $30,154. Noted Oct. 30.

Okla., Tulsa—City, traffic signal system, to Electric Supply Co., 815 East 3rd St., $38,612. Est. $40,000.

Virginia—Virginia Electric & Power Co., 7th and Franklin Sts., Richmond, new transmission line from Roanoke Rapids to Petersburg. $500,000 Work started.

Ont., Rockliffe—Federal Dist. Comn., Ottawa Electric Bldg., Ottawa, installing lighting system along government driveway, day labor. $30,000. D. Blair, Ottawa Electric Bldg., Ottawa, engr. Noted Nov. 13.

SPORTS AND PARKS

PROPOSED WORK

Mass., Waltham — H. L. Hovey Institute, Inc., C. F. Stone, administrator, plans by Hartwell & Richardson, 80 Boylston St., Boston, bathing pavilion, Main St. $85,000.

Me., Farmington—Farmington State Normal School, plans by Bunker & Savage, 254 Water St., Augusta, gymnasium at Normal School. $40,000.

Mass., Great Barrington—See "Buildings—Unclassified."

Mass., Newton—City, S. Weeks, mayor, City Hall, 1 story, brick, concrete shelters at various playgrounds. Architect not selected. To exceed $25,000.

Mass., South Boston (sta. Boston)—City of Boston, Park Dpt., 33 Beacon St., Boston, tower approach to Thomas Park from Stramway to East 8th St., with wall running parallel to Covington St. $100,000. J. J. Murphy, Park Dpt., Boston, engr.

N. H., Exeter—Robinson Seminary, A. J. Connor, chn. com., plans gymnasium. $50,000. Engineer not selected.

N. J., Garfield—Bd. City Council, City Hall, sketches concrete stadium, athletic field on Dahnerts Lake. $25,000 or more.

N. J., Passaic—Bd. City Comrs., City Hall, park and playground at Summer St. between Lexington and Central Aves. $25,000. Engineer not selected.

Okla., Elk City—Preliminary plans municipal swimming pool. $25,000. J. Hassler, Elk City, engr.

BIDS ASKED

Mass., Springfield—See "Contracts Awarded."

N. J., North Long Branch — H. I. Braun, archt., 191 Bway., Long Branch, bids about Dec. 15, general contract 1 story, basement, brick, steel bathing pavilion, Ocean Ave., for S. A. McNair, 388 Ocean Ave., Long Branch. Noted Nov. 6.

N. Y., New York—Dec. 9, by Park Bd., W. R. Herrick, pres. Park Dpt., Arsenal Bldg., reconstructing walk north side Bronx and Pelham Parkways east of Southern Blvd., and trunk line drainage system at Rice Memorial Playfield, Pelham Bay Park, both Bronx Boro; repairing sheet asphalt paving in parks and parkways during year 1930, Contr. 2, resetting curbs and sidewalks 2nd Ave., concrete parapet and wall at Pinehurst Ave. and J. Hood Wright Park, cement walk in St. Catherine's Park at 67th and 68th Sts. west of 1st Ave., wading pool and appurtenances in 59th St. playground, wading pool, appurtenances in Chelsea Park, heating repairs in boiler room of Pavilion Building, De Witt Clinton Park, 11th Ave. at 53rd St., resurfacing playgrounds in St. Gabriel's, Carmansville and St. Nicholas Parks, asphalt repaving walks in Hamilton Fish Park, all foregoing in Manhattan Boro.

CONTRACTS AWARDED

Conn., Waterbury—City, Park Dpt., City Hall, municipal golf course, $25,000 or more. Owner builds. R. Cairns, City Hall, engr.

Mass., South Boston (sta. Boston) — Park Dpt., 33 Beacon St., Boston, grading, sanding beach at Columbus Park, to Coleman Bros., Inc., 245 State St., Boston, $35,750. Noted Nov. 13.

Mass., Springfield—City, Park Dpt., City Hall, municipal golf course, Crosstown Blvd., day labor under supervision of Stiles & Van Kleek, landscape archts., 97A Newbury St., Boston. To exceed $25,000. Noted Nov. 6.

HEATING AND VENTILATING

BIDS ASKED

Mass., Pittsfield—See "Contracts Awarded."

Mo., Kansas City — Kansas City Power & Light Co., 14th and Grand Sts., taking bids heating and plumbing for proposed 30 story office.

N. Y., Brooklyn—Dec. 11, by H. Hesterberg, pres. Brooklyn Boro, Boro Hall, heating and ventilating work in making alterations, repairs to Montrose Ave. Bath; changing, repairing, heating, ventilating and plumbing in Montrose Avenue Bath.

CONTRACTS AWARDED

Mass., Jamaica Plain (sta. Boston)—City of Boston, Dpt. School Buildings, heating and ventilating in school, Centre St. and Pershing Rd., to J. J. Hutley & Co., 104 Bway., Boston, est. exceeds $25,000; electrical work, to M. B. Foster Electric Co., 514 Atlantic Ave., Boston. Noted June 26 under "Schools."

Mass., Pittsfield—General Electric Co., heating, plumbing and electrical work in transformer tank shop, Tyler St., day labor. To exceed $25,000. Noted Oct. 30.

N. J., Hillsdale—Dpt. Institutions & Agencies, Trenton, heating and plumbing for 4 dormitories at New Jersey State Hospital, to Burns, Lane & Richardson Co., 41 Adams St., Trenton, $43,380 and $43,884 respectively. Noted Nov. 13 Daily.

N. J., Newark—Prudential Life Insurance Co., Prudential Bldg., heating for six 5 and 6 story, basement, brick, steel, to Jaehnig & Peoples, Inc., 221 13th Ave.; plumbing, to S. F. Wilson, 476 Clinton Ave.; electrical work, to P. H. Jaehnig, Inc., 106 Academy St. Noted Nov. 20 under "Residential, Contracts Awarded."

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UNCLASSIFIED

PROPOSED WORK

Colorado—GAS PIPE LINE—Colorado Interstate Gas Co., c/o F. J. Trelease, Colorado Springs, preliminary surveys 8 and 10 in. diam. gas pipe line from Devine to Portland. $500,000. Ford, Bacon & Davis, Colorado Springs, resident engrs. in charge.

Mo., Carrollton — GAS SYSTEM — Urban Service Co., Kansas City, natural gas distribution system. $80,000.

Okla., Oklahoma City—OIL BOOSTER PUMPING STATION—Continental Oil Co., Ponca City, 12,000 bbl. daily capacity oil booster pumping station near oil fields. $25,000. Private plans. E. H. Skinner, mgr. Pipe Line Dpt.

BIDS ASKED

Ind., Dublin — TANKS — See "Contracts Awarded."

N. Y., Long Island City—FERRY TERMINAL—Dec. 8, by A. Goldman, comr. Plant & Structures, Municipal Bldg., New York, ferry terminal, incl. steel buildings, steel towers, ferry bridges, machinery and electrical apparatus, foot Astoria Ave.

N. Y., New York—CELL TIERS—Dec. 8, by R. C. Patterson, comr. Dpt. Correction, Municipal Bldg., altering 8 tiers of south wing, at City Prison, 101 Centre St.

N. Y., New York—MACHINERY and CONTROL EQUIPMENT—Dec. 10, by A. Goldman, comr. Plant & Structures, Municipal Bldg., furnishing, erecting machinery and control equipment for Ship Canal Bridge over Harlem River near 225th St.

O., Cleveland—ELECTRICAL WORK—Dec. 22, by Bd. Educ., F. G. Hogen, dir., electrical work for new John Marshall School. $85,000. G. M. Hopkinson, Auditorium Garage Bldg., engr.

O., Columbus— ELEVATORS — Dec. 9, by State Office Building Comn., State House, elevators in Ohio State Office Building. H. Hake, 2400 Gilbert Ave., Cincinnati, archt.

Pa., Baden—LIVER RAIL TERMINAL—W. D. Wiggins, sh. engr. (Central Region), Pennsylvania R.R. Co., Pennsylvania Sta., Pittsburgh, taking bids masonry, machinery, equipment for river rail terminal to handle 3,200 tons coal each 8 hr. shift from barges to railroad cars on Ohio River, near here. $350,000.

Ont., London — CABLE — See "Contracts Awarded."

Ind., Dublin—TANKS—Gulf Pipe Line Co., Frick Building Annex, Pittsburgh, Pa., six 80,000 bbl. capacity tanks on 88 acre site, near here, separate contracts. Est. $150,000. J. H. Dalton, Pittsburgh, Pa., engr.

CONTRACTS AWARDED

Mass., Medford (br. Boston)—FOUNDATION—Medford Co-Operative Bank, L. H. Lovering, pres., concrete foundation for bank, High St., to Frankini Bros., 30 Mystic Ave. Est. $25,000. Noted July 3 under "Banks."

Pa., Pittsburgh—ELECTRICAL WORK—See "Schools under Bids Asked."

Texas—NATURAL GAS PIPE LINE—Oklahoma Natural Gas Co., 624 South Boston St., Tulsa, Okla., and San Angelo, 12 in. welded c.i. natural gas pipe line from Big Lake oil fields to San Angelo. also 8 in. line to Girvin, own forces. $175,000. Private plans.

Ont., London—CABLE—Telephone Co., 291 Dundas St., R. Stratton, genl. mgr., extending cable in East London, by company's engineers. $25,000.

MATERIALS

BIDS ASKED

BRIDGE LUMBER—**Sigourney, Ia.**—Dec. 9, at office Auditor Keokuk Co., treated and untreated bridge lumber and piling, also corrugated metal culvert pipe. R. C. Fye, Sigourney, co. engr.

BITUMINOUS PATCHING MATERIAL — **Boston, Mass.** — Dec. 9, by Supply Dpt., P. A. Chapman, supt., bituminous patching material as specified and delivered as required to Dpt. P. Wks.

PIPE STOCK, etc.—**Boston, Mass.**—Dec. 9, by Supply Dpt., P. A. Chapman, supt., 200,000 lb. service pipe stock, 200,000 lb. frames, covers, iron castings, 100,000 lb. iron castings, to Water Serv.

BRANCHES, CURVES, etc.—**Boston, Mass.**—Dec. 10, by Supply Dpt., P. A. Chapman, supt., 400,000 lb. branches and curves, iron castings; 350,000 lb. gate and hydrant castings, 400,000 lb. two-part boxes, to Water Serv.

COMPOSITION CASTINGS—**Boston, Mass.**—Dec. 11, by Supply Dpt., P. A. Chapman, supt., 13,000 lb. No. 1, 20,000 lb. No. 2 and 5,000 lb. No. 3 composition castings.

ASPHALTIC CEMENT—**Brooklyn, N. Y.**—Dec. 11, by H. Hesterberg, pres. Brooklyn Boro, Boro Hall, 200,000 gal. asphaltic cement for sheet asphalt and bituminous concrete mixtures B in liquid form; 5,000 cu.yd. asphalt sand; 1,000 net tons limestone or other suitable inorganic dust; 2,000 cu.yd. binder stone.

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DRIVE CHAINS—**Newark, N. J.**—Dec. 8, by Bd. City Comrs., City Hall, drive chains, pig lead, brass tees and faucets, limestone dust, asphalt, cement and filler, cold patch asphaltic road oil, soft steel, cracked stone, soil pipe, tile pipe, etc.

CAST IRON PIPE, etc.—**El Paso, Tex.**—Dec. 11, by City, c/o G. B. Davis, purch. agt., 400 ft. Class B c.i. bell and spigot pipe, 12 ft. lengths; 5,100 ft. 20 in. centrifugal or Hitensil Class 100 c.i. pipe, weighing not less than 133 lb. to ft.

CONTRACTS AWARDED

EDGESTONES—**Boston, Mass.**—City, Supply Dpt., 40,000 lin.ft. straight edgestones to Paving Service, Dpt. P. Wks., to T. H. McVey, 53 Market St., Brighton, $38,000.

WATER PIPE—**Boston, Mass.**—City, Transit Dpt., 1 Beacon St., 48 in. welded steel waterpipe and specials, to Walsh Holyoke Steam Boiler Wks., Inc., Appleton St., Holyoke, $49,798. Noted Nov. 13.

SCREENINGS, etc. — **St. George, N. Y.** — J. A. Lynch, pres. Richmond Boro, 400 cu.yd. broken stone and chips, to South Shore Coal Co., Giffords Lane, Donigan Hills, $1,180 and $2,065 respectively; 600 cu.yd. trap rock, to Vanbro Constr. Co., 24 Elizabeth St., West New Brighton, $1,770. Grand total $5,015. Noted Nov. 6.

CAST IRON PIPE—**Fort Worth, Tex.**—City Waterworks, c/o L. A. Quigley, 1,000 tons c.i. pipe to U. S. Cast Iron Pipe Co., Dallas, at $45 per ton, total $45,000.

EQUIPMENT

PROPOSED WORK

TRACTOR and GRADER—**Carmel, Calif.**—City purchasing tractor and grader for Street Dpt.

BIDS ASKED

TRUCKS—**St. Paul, Minn.**—Dec. 15, by G. J. Ries, aud. Ramsey Co., 920 Guardian Bldg., 4 light-weight trucks with 1½ ton steel dump bodies; 1 bituminous materials distributor with 1,000 gal. insulated tank. $6,800. P. N. Coates, co. surv.

TESTING MACHINE—**New York, N. Y.**—Dec. 11, by Bd. Higher Education, Main Bldg., 139th St. and Convent Ave., testing machine in testing laboratory of Compton Hall, College of City of New York, 140th St. near Amsterdam Ave.

MOTOR—**Blackwell, Okla.**—Dec. 18, by City, D. Randell, city clk., 50 hp. motor direct connected to centrifugal boiler feed pump; piping, connections, for Waterworks Dpt.

ROAD GRADERS—**Abilene, Tex.**—Dec. 23, by Taylor Co., c/o T. K. Epslen, judge, 1 or more 12 ft. road graders.

TRACTORS—**San Angelo, Tex.**—Dec. 13, by Tom Green Co., c/o J. T. Mathison, judge, 1 or more crawler type tractors and 1 or more graders. E. Beaver, San Angelo, co. engr.

SWITCHING and FILTER EQUIPMENT, etc. —**Niagara Falls, Ont.**—See "Waterworks."

FOREIGN

Alaska—G. T. Cameron, c/o San Francisco Chronicle, 5th and Mission Sts., San Francisco, Calif., plans hydro-electric project, pulp and paper plant in vicinity of Juneau. $15,000,000. **Maturity indefinite.** Application made to Federal Power Comn. for site.

Alaska—Harry Chandler, c/o Los Angeles Times, 100 North Bway., Los Angeles, Calif., plans hydro electric project, pump and paper mills in vicinity of Juneau. $15,000,000. Application made to Federal Power Comn. for site.

Alaska—I. and J. D. Zellerbach, c/o Zellerbach Paper Co., 534 Battery St., San Francisco, Calif., plans hydro electric power plant, pulp and paper mills, in vicinity of Kelchikan. $15,000,000. Application made to Federal Power Comn. for site.

Mexico, Atzacapotzalco—Agnila Oil Co. (Mexican Eagle Oil Co.) Mexico City, plans oil refinery on pipe line (under construction) from Tampico to Mexico City. To exceed $500,000. Noted June 27.

Mexico, Monterrey — Cuauhtemoc Industries, improving industrial plants, incl. large concrete, brick malt house, machinery and equipment, to Rheiner & Kroeger, c/o Builders Exchange Bldg., San Antonio, Tex., $175,000.

Buildings

BUILDINGS—RESIDENTIAL

BIDS ASKED

Idaho, Twin Falls—Paramount Hotel Co., S. E. Rich, mgr., bids after Jan. 1, general contract 8 story, 125 x 125 ft. hotel, theatre, $400,000. S. W. Winburn, Beason Bldg., Salt Lake City, Utah, archt.

N. J., East Orange—See "Contracts Awarded."

N. J., Jersey City—F. G. Hasselman & A. J. Sherman, archts., 34 Prospect St., East Orange, taking new bids general contract 12 story, basement, 100 x 105 ft., brick, steel, Hudson Blvd. and Gifford Ave., for Gifford Realty Co., c/o architects. $450,000. Former bids rejected. Noted Aug. 8.

N. J., Newark—E. A. McMurray, archt., 339 Millburn Ave., Millburn, bids about Dec. 15, general contract 2 story, basement, brick, steel apartment, stores, 18th and Melrose Aves., for owner, c/o archt. $150,000.

N. Y., Astoria—See "Contracts Awarded."

N. Y., Bayside—See "Contracts Awarded."

N. Y., Brooklyn—See "Contracts Awarded."

N. Y., Jackson Heights — See "Contracts Awarded."

N. Y., Jamaica—See "Contracts Awarded."

N. Y., Long Beach—See "Contracts Awarded."

N. Y., Long Island City — See "Contracts Awarded."

N. Y., New York—See "Contracts Awarded."

N. Y., New York—Boak & Paris, archts., 10 East 40th St., taking bids separate contracts, 314 Riverside Dr., for A. S. and H. M. Hall Realty Co., 200 West 72nd St. $525,000. Noted Nov. 27.

N. Y., Queens Village — See "Contracts Awarded."

CONTRACTS AWARDED

Calif., Hollywood—Cherokee Properties Ltd., Los Angeles, 10 story, basement, 100 x 105 ft., rein.-con., Franklin and Cherokee Sts., to Herbert M. Baruch Corp., 1015 Lincoln Bldg., Los Angeles. $275,000.

Calif., Los Angeles—Cherokee Properties Ltd., c/o M. P. Miller, archt., Bd. of Trade Bldg., 10 story, basement, Class A rein.-con., Cherokee Ave., to Baruch Corp. Ltd., Lincoln Bldg., $275,000.

N. J., East Orange—S. D. Goldberg, 45 Branford Pl., Newark, 4 story, basement, brick, steel, 110-12 Walnut St., separate contracts, $150,000. Bottelli & Bottelli, 45 Branford Pl., Newark, archts.

N. Y., Astoria—Mollie Arms Corp., 158-15 Oak Ave., Flushing, 6 story, basement, 90 x 100 ft., Crescent St. and 33rd Ave., separate contracts. $200,000. W. Hohauser, 17 West 44th St., New York, archt.

N. Y., Bayside—Nusloss Bros., 175-26 Henley Rd., Jamaica, 2 story, basement, brick, steel, 43rd Ave. and 216th St., separate contracts. $150,000. B. Braunstein, 163-18 Jamaica Ave., Jamaica, archt.

N. Y., Brooklyn—Asher Dann & Sons, 6115 5th Ave., 90 x 100 ft. apartment, 37th St. and Church Ave., separate contracts. $185,000. S. L. Malkind, 93 Court St., archt.

N. Y., Brooklyn—B and B Building Corp., D. Berg, pres., 760 Saratoga Ave., 6 story, 60 x 90 ft., 23rd Ave. and 63rd St., separate contracts. $150,000. J. J. Millman, 67 Court St., archt.

N. Y., Brooklyn—Brighton Towers Corp., H. Richmond, 242 Herzl St., 6 story, 84 x 100 ft., Darby St. and Brightwater Court, separate contracts. $150,000. Cohn Bros., 361 Stone Ave., archt.

N. Y., Brooklyn—Britten Wood, Inc., 2064 Nostrand Ave., G. V. McPherson, pres., 6 story, 84 x 120 ft., Nostrand Ave. and Farragut Rd., separate contracts. $225,000. J. Martire, 545 5th Ave., New York, archt.

N. Y., Brooklyn—Chase Apartments, Inc., E. B. Waldron, pres., 120 Liberty St., New York, 61 x 125 ft., Ovington St. and West 3rd Ave., separate contracts. $170,000. Private plans.

N. Y., Brooklyn—Garden Operating Corp., N. Remper, pres., 6203 Fort Hamilton Parkway, 6 story, 90 x 100 ft., Bay Parkway and 62nd St., separate contracts. $250,000. J. J. Millman, 67 Court St., archt.

N. Y., Brooklyn — Gunlo Realty Co., 8665 24th Ave., 6 story, 100 x 100 ft., 64th St. and Bay Parkway, separate contracts, $150,000. M. Hirsch, 350 Stone Ave., archt.

N. Y., Brooklyn — Isaac Salmonowitz, 44 Court St., 6 story, 60 x 120 ft., Ditmars Ave. and East 2nd St., separate contracts. $150,000. Cohn Bros., 361 Stone Ave., archt.

N. Y., Brooklyn—J. C. Building Corp., 291 East 3rd St., S. Cohen, secy., 6 story, 110 x 200 ft., 15th Ave. and 52nd St., separate contracts. $425,000. Seelig & Finkelstein, 153 Pierrepont St., archts.

N. Y., Brooklyn—Lemark Building Corp., J. Marcowitz, pres., 1317 Park Pl., 6 story, East 9th St. and Avenue M, separate contracts. $150,000. Cohn Bros., 361 Stone Ave., archt.

N. Y., Brooklyn—Loqua Building Corp., L. Quadre, pres., 185 East 23rd St., 6 story, basement, 84 x 120 ft., brick, Avenue O and East 18th St., separate contracts. $150,000. M. W. Del Gaudio, 595 5th Ave., New York, archt.

N. Y., Brooklyn — One Thousand Eight Hundred Thirty-Seven East 17th Street Corp., J. L. Spence, pres., 1501 Kings Highway, 6 story, 83 x 100 ft., East 17th St. and Avenue R, separate contracts. $225,000. Seelig & Finkelstein, 153 Pierrepont St., archt.

N. Y., Brooklyn — Savenne Realty Co., J. Baum, pres., 11 East 38th St., New York, 6 story, 99 x 135 ft., Ocean Ave. and Avenue R, separate contracts. $250,000. C. P. Cannella, 1163 Herkimer St., archt.

N. Y., Brooklyn — Sorch Realty Corp., L. Sorkin, pres., 211 East 53rd St., 6 story, 84 x 120 ft., Avenue O and West 11th St., separate contracts. $150,000. Cohn Bros., 361 Stone Ave., archt.

Buildings—Residential (Continued)

N. Y., Jackson Heights — Windsor Constr. Corp., 93rd St. and Northern Blvd., 6 story, 85 x 160 ft., 81st St. and Roosevelt Ave., separate contracts. $350,000. W. Hohauser, 17 West 44th St., New York, archt.

N. Y., Jamaica—Moss Bros., 163-18 Jamaica Ave., apartments, South Conduit Ave. and 231st St., separate contracts. $150,000. D. J. Levinson, 163-18 Jamaica Ave., archt.

N. Y., Long Beach—Dalan Building Co., 26 Court St., Brooklyn, apartment, Bway. and Natl. Blvd., separate contracts. $1,000,000. Malkind & Weinstein, 93 Court St., Brooklyn, archts.

N. Y., Long Island City—Fieldwood Realty Corp., 69th St. and Roosevelt Ave., apartments, 42nd St. and Queens Blvd., separate contracts. $160,000. C. Stidolph, 8701 51st Ave., Newtown, archt.

N. Y., New York—Menlo Building Co., 3510 White Plains Ave., 6 story, basement apartment, store, Gunhill and Toyon Rds., separate contracts. $150,000. Franklin, Bates, Heinemann, 2526 Webster Ave., archts.

N. Y., New York — Robert Garder Realty Corp., R. A. W. Carleton, pres., 1476 Bway., apartment, to Fred T. Ley, 578 Madison Ave. Est. $700,000. Noted Nov. 27.

N. Y., New York — H. Havermeyer, Islip, 14 story, to C. T. Wills, 286 5th Ave. Est. $1,600,000. Noted Nov. 20.

N. Y., Queens Village — R. G. H. Cornish, 8752 113th St., 6 story, 113th and Lexington Sts., separate contracts. $160,000. W. Haugaard, 185 Madison Ave., New York, archt.

Okla., Norman—Aldridge Hotel Co., Wewoka, 7 story, basement, 75 x 140 ft. hotel, to F. Cobb, Norman, $250,000. Noted Nov. 20.

CLUBS

PROPOSED WORK

Calif., Long Beach—Long Beach Lodge, B.P.O.E. 888, Cedar Ave. and Ocean Blvd., plans by W. H. Austin, Pacific Southwest Bldg., 3 story, basement, 80 x 150 ft., rein.-con., Cedar Ave. and Ocean Blvd. $300,000.

Ind., Indianapolis — Women's Club of Indianapolis, R. N. Edwards, 720 Illinois Bldg., constr. promoter, sketches 5 story, rein.-con., brick addition to Keith Theatre, 117 North Penna St. $500,000. Architect not selected.

N. J., Englewood — Englewood Women's Club, C. Packard, secy., 224 Glenwood Rd., 2 story, basement, brick, steel, Lydecker St. $150,000. **Maturity about April.** Noted Oct. 30.

N. J., Long Branch — Newton White, c/o Warren & Wetmore, archts., 16 East 47th St., New York, 2 story, basement, brick club house, bath houses, convention hall, Avenal Ave. and Ocean Front. $300,000. **Maturity in spring.** Noted Oct. 9.

N. C., Charoltte—Charlotte Country Club, c/o H. M. Wade, Charlotte, plans by Aymar Embury 2nd, 150 East 61st St., New York, and takes bids after January, new club house. To exceed $150,000. Noted Oct. 30.

O., Toledo—Y. M. C. A., 423 Michigan St., c/o H. Anderson, plans by Mills, Rhines, Bellman & Nordhoff, archts. and engrs., Ohio Bldg., 8 story, basement, brick, steel, concrete, Jefferson Ave. $1,000,000.

Que., Hull—Royal Ottawa Golf Club plans by Horwood & Horwood, Fraser Bldg., Ottawa, rebuilding golf club house, Aylmer Rd., recently destroyed by fire. $200,000.

BIDS ASKED

Minn., St. Paul—Dec. 12, by Women's City Club of St. Paul, A. M. O'Brien, chn. building com., 1318 Pioneer Bldg., 4 story, basement, brick, rein.-con., stone, 3rd and St. Peter Sts. $175,000. Noted May 29.

N. J., Weehawken—W. Mahnken, archt., 401 Hudson Ave., Union City, bids about Jan. 15, general contract 3 story, basement, brick, steel addition, Boulevard E and 6th St., for B.P.O.E., 2-6th St. $150,000. F. J. Ricker, 685 Hudson Ave., West New York, assoc. archt. Noted Nov. 13.

CONTRACTS AWARDED

Ia., Dubuque—Masonic Temple Assn., G. L. Dewey, secy., P. O. Box 165, general contract 3 story, mezzanine, balcony, 100 x 147 ft., rein.-con., brick, stone, steel, 12th and Locust Sts., to W. L. Yokum, 730 Main St., $181,899. Noted Nov. 6.

Mich., Detroit—Y. M. C. A., A. G. Studer, Witherell St., general contract 4 story, basement, brick, steel, stone, rein.-con., to A. A. Albrecht Co., 1201 Penobscot Bldg.; steam heating, to Lorne Plumbing & Heating Co., 641 West Congress St. Est. $400,000. Noted May 15.

Que., Hull—Royal Ottawa Golf Club, Aylmer Rd., steel, plain found., to Ross-Meagher, Elgin St., Ottawa, Ont. Est. $200,000.

HOSPITALS

PROPOSED WORK

Calif., San Francisco—Homeopathic Foundation Co. of California, 391 Sutter St., sketches Class A hospital, California and Maple Sts. $500,000 or more. Architect not selected.

Calif., San Francisco—City and San Francisco Co. plans by A. I. Coffey, Phelan Bldg., Psychopathic Institute, rein.-con. Class A. $400,000.

Calif., San Francisco—City and San Francisco Co. plans by A. I. Coffey, Phelan Bldg., cancer hospital, Class A, rein.-con. $400,000.

Conn., Hartford — Hartford Hospital, R. Rowley, chn. com., 23-25 South Hudson St., sketches by Kendall, Taylor & Co., 209 Columbus Ave., Boston, Mass., 3 story, brick, rein.-con., steel nurses home, swimming pool, South Hudson St. $150,000.

Conn., Willimantic—St. Joseph's Hospital, 88 Jackson St., J. F. Carr, pres. trustees, plans by Crow, Lewis & Wick, 200 5th Ave., New York, hospital, nurses' home. Funds being raised. C. Neergard, 512 5th Ave., New York, engrs. Noted Oct. 2.

Mass., Brookline—Brooks Hospital, W. O. Taylor, pres., Bd. Trustees, c/o Boston Globe, 244 Washington St., Boston, nurses' home, 200 Summit Ave. $150,000-$200,000. Architect not selected.

Mass., Waltham — Commonwealth of Massachusetts, Dpt. Mental Diseases, State House, Boston, sketches by G. Robb, 14 Beacon St., Boston, 4 story, basement, brick medical and surgical building at Metropolitan State Hospital. $400,000.

N. H., Claremont—Claremont Hospital, Superintendent, altering and constructing nurses home and hospital addition. $150,000. Architect not selected.

N. H., Littleton—Littleton Hospital, H. M. Eaton, pres. Bd. Trustees, bids in January, general contract, hospital. $150,000. Rich, Mathesius & Koyl, 320 5th Ave., New York, archt. Noted Nov. 20.

N. J., Preakness—Bd. Freeholders Passaic Co., Court House, Paterson, revised sketches by F. W. Wentworth, 140 Market St., Paterson, 3 story, basement, brick, steel welfare house and detention home, Oldham Rd. $600,000. Noted July 31 under "Valley View."

O., Cleveland—City, D. S. Blossom, dir. P. Welfare, plans by H. Kregelius, 504 City Hall, 4 story, basement, tuberculosis sanitarium, brick, steel, concrete, stone, Scranton Rd., $1,000,000; 5 story, brick, steel, concrete addition to tuberculosis sanitarium Warrensville Farm, $250,000. Noted Nov. 20.

O., Ravenna — Robinson Memorial Hospital, c/o Bd. Comrs. Portage Co., sketches by Hubbell & Benes, 4500 Euclid Ave., Cleveland, 3 story, brick, steel, concrete hospital. $150,000. Noted Sept. 4.

Okla., Tulsa—Tulsa Co. Medical Society, c/o S. C. Venable, pres., 1135 South Quaker St., sketches 4 story hospital. $250,000.

Vt., Burlington—Mary Fletcher Hospital, T. S. Brown, 419 South Prospect St., sketches by McKim, Meade & White, 101 Park Ave., New York, reconstructing hospital. To exceed $150,000. **Maturity indefinite.**

Que., Montreal—Hospital St. Luc addition, St. Denis St. $600,000.

BIDS ASKED

Calif., Stockton—Dec. 16, by State Dpt. P. Wks., Sacramento, 2 story, part basement, 14,500 sq.ft. floor space, rein.-con. hospital, and 2 story, 6,150 sq.ft. floor space, rein.-con. industrial building on State Hospital grounds.

Ind., Indianapolis — Riley Hospital, West Michigan St., bids about Jan. 1, Riley Hospital for Children, 2 story, basement, 75 x 150 ft., rein.-con., brick, stone. $200,000. R. F. Daggett, 922 Continental Bldg., archt. Noted Aug. 14.

Mass., Somerville—Dec. 9, by Stevens & Lee, archts., 45 Newbury St., Boston, 4 story, basement, brick, rein.-con., steel, plain found., Crocker and Towner Sts. for Somerville Hospital, F. J. Dreyer, chn. Building Com., $160,000; heating and ventilating $25,000 or more; plumbing $25,000; electrical work, elevators, $25,000. Noted Oct. 23.

N. Y., New York—Dpt. Hospitals, Municipal Bldg., bids about Jan. 1, general contract nurses home at Harlem Hospital, 27 West 136th St. $700,000. Sloan & Robertson, 420 Lexington Ave., archts.

CONTRACTS AWARDED

N. Y., Brooklyn—Dpt. Hospitals, Municipal Bldg., New York, altering hospital, elevator shafts, elevators, at Kings County Hospital, to Otis Elevator Co., 130 Clinton St. Est. $215,000.

CHURCHES

PROPOSED WORK

Calif., Los Angeles—Bethany Presbyterian Church, 1625 Griffith Park Blvd., plans by H. C. Hartley, Subway Terminal Bldg., about 4 story, 140 x 145 x 193 ft., Class A rein.-con. Griffith Park Blvd.

Calif., Westwood—Roman Catholic Bishop of Los Angeles and San Diego, plans by H. C. Newton and R. D. Murray, 502 Architects Bldg., Los Angeles, rein.-con., timber church, school, rectory, Selby and Ohio Aves. To exceed $500,000.

Conn., Middletown — St. Sebastian Roman Catholic Church, A. Santolini, pastor, 930 Dixwell Ave., New Haven, plans by R. G. Gorriani, 175 Green St., Worcester, Mass., 1 story, basement, brick, stone, Washington St. $150,000. **Maturity in spring.** Noted Nov. 13.

Mass., Arlington (br. Boston)—Church of Our Saviour (Episcopal), W. N. Bixby, 38 Marathon St., sketches by C. C. Coveney, 184 Boylston St., Boston, 2 story, basement, irregular sized, stone, stucco parish house, church tower, Marathon St. $150,000.

Mass., Lawrence — Lawrence Lutheran Church, A. M. Schroeder, 31 Avon St., church, East Haverhill St. $150,000 or more. Architect not selected.

N. J., Carteret—St. Joseph's Roman Catholic Church, C. McCarthy, pastor, 2 story, basement, brick, steel church, rectory, lyceum, $200,000. Architect not selected.

N. Y., Guttenberg—Little Church on the Hill, D. R. Reese, pastor, 3226 24th St., rebuilding 2 story, basement, brick, Bergenline Ave. $150,000 funds being raised for same. **Maturity indefinite.**

N. J., Lyndhurst—Reed Memorial United Presbyterian Church, J. H. Little, pastor, 346 Stuyvesant Ave., sketches 2 story, basement, brick religous educational school. $150,000.

N. Y., Brooklyn—Grace Church, G. Hewlett, secy., 97 Columbia Heights, parish house, rectory, Grace Court and Hook St. $150,000. Bids in. Indefinite when contract will be awarded. F. Hutton, 101 Park Ave., New York, archt. Noted Oct. 9.

N. Y., New York—Madison Avenue Methodist Episcopal Church, R. W. Sockman, pastor, plans by Crane & Fergusson, 258 Boylston St., Boston, Mass., 1 story, basement church, Park Ave. and 60th St. $1,000,000.

Ont., Toronto—First Church of Christ Scientist, R. Monkman, 555 Millwood St., 1 story, basement, brick, stone, concrete, steel, Chatworth Dr. $150,000. Architect not selected.

BIDS ASKED

Mass., Springfield—St. Barnabas Episcopal Church, J. H. Nolan, pastor, taking bids 1 story, basement, brick, stone, plain found., Summer Ave. $150,000. C. C. Coveney, 184 Boylston St., Boston, archts. Noted Nov. 13.

N. J., Darlington—Myers & Shanley, archts., 24 Walnut St., Newark, bids about Feb. 1, general contract 2 story, basement, brick, steel seminary, for Immaculate Conception Seminary. $150,000. Noted Nov. 20.

N. J., Glen Ridge — Guilbert & Betelle, archts., 20 Branford Pl., Newark, bids about Jan. 15, general contract 2 story, basement, brick, steel church, Sunday school, for Glen Ridge Congregational Church, Ridgewood Ave. $150,000. Noted Oct. 16.

N. Y., Brooklyn — Church of Our Lady of Refuge, Ocean and Foster Aves., bids about Jan. 15, general contract church. $250,000. McKenna & Irving, 15 Park Row, New York, archts. Noted Sept. 25.

Ont., Toronto—Dec. 9, by Nicholson & McBeth, archts., 46 Queen St., St. Catherines, 1 story, basement, 80 x 120 ft., brick, stone, steel, concrete, Danforth and Bowden Aves., for Danforth Ave. Baptist Church, G. A. McLean, pastor, Danforth and Bowden Aves. $150,000. Noted Apr. 17.

CONTRACTS AWARDED

Conn., New Haven — St. Thomas Episcopal Church, W. A. Beardsley, pastor, 10 Elm St., 2 story, basement, brick, stone parish house, rectory, plain found. to National Constr. Co., 152 Temple St. Est. $150,000. Noted Oct. 2.

Mo., University City — Congregation Shaare Emeth, 4915 West Pine Blvd., St. Louis, general and carpentry contract 2 story, basement, 160 x 235 ft., brick temple and school to C. B. McCormack Co., 318 North 8th St., St. Louis; rein.-con. work, to McCormack-Combs Constr. Co., Columbia Bldg., St. Louis; brick work, to C. Koopman, Pyramid Brick Co., 5084 Manchester Ave., St. Louis. Total est. $250,000 upwards. Noted Oct. 2.

SCHOOLS

PROPOSED WORK

Calif., Claremont—Pomona College, plans by Webber & Spaulding, 627 South Carondolet St., Los Angeles, 2 story, probably rein.-con. dormitory buildings.

Calif., Oakland — City of Oakland School Dist., plans by C. W. McCall, 1404 Franklin St., steel, concrete high school, 45th Ave. and Foothill Blvd. $400,000.

Colo., Pueblo—Bd. Educ. School Dist. 20, c/o O. Hellbeck, secy.; Central High School Bldg., Bway. and Orman Ave., plans by W. DeMordaunt, 738 1st Natl. Bank Bldg., Carlisle and Bessemer Grade Schools. Election soon $250,000, for same. D. N. Wells, 633 Jackson St., dist. engr.

Conn., West Haven (br. New Haven)—Town, W. Cox, pres. School Bd., sketches by D. E. Smith, 152 Temple St., New Haven, Forest Grade School, 2 story, basement, brick, plain found., Forest Rd. $150,000. Noted Nov. 20.

Ind., Lebanon — Bd. School Comrs. revised plans by C. Beeson, Crawfordsville, rein.-con., brick school, incl. gymnasium, auditorium. $150,000. Noted May 22.

Me., Rumford—Town, L. E. Williams, supt. schools, receiving competitive plans Dec. 1, altering and constructing 2 story, basement, brick, high school addition, incl. gymnasium, auditorium. $150,000. Architect not selected. Noted June 19

Mass., Arlington (br. Boston) — Town, Bd. Selectmen, sketches by Fay, Spofford & Thorndike, 44 School St., Boston, 2 story, basement, brick, plain found., Eastern Ave., Brattle Sect. $150,000. Noted Mar. 27.

Mass., Boston—City, Junior High School, 3 story, basement, brick, limestone, Charlestown Dist., $600,000; 2 story, basement, brick, stone elementary school, Gilbert Stuart Dist., Dorchester, $200,000. Architect not selected.

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Schools (Continued)

Mass., Brighton (sta. Boston) — St. John's Ecclesiastical Seminary, Lake St., plans by M. P. Meade, 80 Boylston St., Boston, 3 story, basement, brick, stone seminary, plain found., Foster St. $150,000-$175,000.

Mass., Cambridge—City, J. J. Terry, supt. P. Buildings, two 2 story, basement, brick, limestone additional units for high school, Broadway and Irving St. $250,000 each. Architect not selected. Noted Feb. 27.

Mass., Hanover — Town, E. Sylvester, chn. Building Comn., 2 story, basement, 8 room, brick school. $150,000 or more. Architect not selected.

Mass., Newton—City, S. Weeks, mayor, City Hall, brick grade school, Linwood Ave. and Nevada St. To exceed $150,000. Architect not selected.

Mass., Newton — City, S. Weeks, mayor, sketches by E. I. Leeds, 216 Tremont St., Boston, altering and constructing 2 story, basement, school addition, Arlington St. $150,000 or more. Noted Nov. 20.

Mo., St. Louis—Washington University, G. R. Throop, chancellor, Skinker and Lindell Blvds., bids early in 1931, School of Architecture, 3 story, basement Forsythe St., west of Skinker St. $360,000 funds donated. Jamieson & Spearl, Arcade Bldg., archts.

N. H., Durham—University of New Hampshire, E. M. Lewis, sketches by Kilham, Hopkins & Greeley, 9 Park St., Boston, Mass., infirmary, rest house, college campus. $150,000.

N. H., Exeter—Phillips Exeter Academy, L. Perry, principal, sketches by Cram & Ferguson, 248 Boylston St., Boston, Mass., 2 wings on main academy, college campus, $150,000 or more; also central heating plant, to exceed $40,000.

N. J., Hawthorne — Bd. Educ., Lafayette School, brick steel high school. $150,000. **Maturity probably soon.**

N. J., Rumson—Bd. Educ., B. H. Borden, pres., 2 story, basement, brick, steel high school, plain found., Ridge Rd. $150,000. **Maturity indefinite.**

N. J., New Brunswick — York & Sawyer, archts., 100 East 42nd St. New York, soon lets contract new revised general contract bids (from low bidders) 3 story, basement, brick, steel, rein.-con. gymnasium, plain found., College Field, for Rutgers University Thomas, pres., College Ave. $600,000. Noted Nov. 6.

N. J., Totowa—Bd. Educ., School Bldg., 2 story, basement, brick, steel, plain found. $150,000. **Maturity indefinite.** Architect not selected.

N. J., Trenton—Dpt. Institutions & Agencies, State House Annex, State School for Deaf, brick, steel. $150,000 or more. Architect not selected.

N. J., Trenton—State Bd. Educ., addition to teachers college, Hillwood Lakes Sect. $150,000. Architect not selected.

N. J., Wood Ridge (br. Rutherford)—Church of Assumption, G. W. Aramanda, chn. com., 470 Main Ave., raising $150,000 funds 2 story, basement, brick, steel school. **Maturity indefinite.** Architect not selected. Noted Oct. 16.

O., Painesville—Bd. Educ., E. Tucker, clk., sketches by Fulton & Taylor, 8120 Euclid Ave., Cleveland, brick, steel, concrete additions to Harvey High School and North End Grade School and new 4-room grade school, $200,000.

O., Springfield—Bd. Educ. Springfield Twp., (Summit Co.), E. Boyer, clk., plans by Henry & Murphy, 2nd Natl. Bldg., Akron, 3 story, basement, brick, steel, concrete high and grade school. $225,000.

Ont., Toronto—Bd. Educ., 155 College St., plans by C. Dyson, 155 College St., and soon takes bids 2 story, basement, brick, concrete, stone, steel additions to Bedford Park and Victrola Park Schools. $180,000.

BIDS ASKED

Calif., Berkeley — Dec. 10, by Bd. Regents University of California, Eshleman Memorial (Students Publishing Building), 2 story, Class A rein.-con., on campus. $250,000. G. W. Kelham, 315 Montgomery St., San Francisco, archt. Noted Oct. 1.

Calif., Pasadena — California Institute of Technology, bids about Jan. 1, general contract school. Mayers, Murray & Phillips, 2 West 47th St., New York, archts. Noted Oct. 8.

Conn., New Canaan—Town, Bd. Selectmen, G. T. Smith, bids about Dec. 10, Junior High School, 2 story, basement, brick, incl. classrooms, 5 offices, gymnasium, auditorium, South Ave. $225,000. J. N. Pierson & Son, Perth Amboy, N. J., archts. Noted Oct. 30.

Ind., Lawrence — Dec. 13, by Bd. School Comrs., 2 story, basement, rein.-con., brick, steel, stone consolidated school, $150,000. L. Hoatson, 311 Holliday Bldg., Indianapolis, archt.

Ia., Ft. Dodge—Dec. 9, by E. O. Damon, Jr., archt., 19 East Mason Bldg., and F. W. Griffith, archt., 400 Snell Bldg., Junior High School, 2 story, basement, rein-con., brick stone, for Bd. Educ., E. Peterson, secy. $225,000. Nov. 27.

Mass., Quincy—Dec. 8, by City, Comn. P. Wks., City Hall, and Harper & West, archts., 92 State St., Boston, altering and constructing 2 story, basement, brick, steel school addition, plain found., South Quincy Sect. $150,000. Noted Sept. 11.

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Mass., Roslindale (sta. Boston)—Dec. 11, by City of Boston, Dpt. School Buildings, 2 story, basement, brick, stone, plain found., Charles Sumner Dist., Poplar St. $200,000. D. Somes, 240 Boylston St., Boston, archt. Noted Nov. 6.

Mass., Springfield—J. W. Foster, archt., 105 Bridge St., taking bids separate contracts 2 story, basement, 80 x 120 ft., brick, stone, plain found., Chestnut St., for Hebrew Free School Assn., N. E. Goldstein, pres., 103 Bridge St. $150,000. Noted July 24, 1929.

N. J., Clifton—Bd. Educ., High School Bldg., bids about Jan. 15, general contract 2 story, basement, brick, steel, rein.-con. school, auditorium, plain found., Clifton Ave. $250,000. Lee & Hewitt, 152 Market St., Paterson, archts. Noted Sept. 25.

N. J., Roselle Park—Bd. Educ., W. F. Bigelow, bids about Jan. 15, 2 story, basement, brick, steel, rein.-con. high school, plain found. $360,000. H. B. Brady, Inc., 333 North Broad St., Elizabeth, archt. Noted Nov. 13.

N. Y., New York—Dec. 16, by W. C. Martin, archt. and supt. School Buildings, Flatbush Ave. and Concord St., Brooklyn, general contract Bronx Continuation School, East 151st through to East 152nd Sts., west of Courtlandt Ave., for Bd. Educ., 500 Park Ave.

N. Y., Port Chester—Dec. 5, by Bd. Educ., high school. $1,000,000. Tooker & Marsh, 101 Park Ave., New York, archts. Noted Oct. 2.

O., Cleveland—Dec. 15, by Bd. Educ., F. G. Hogen, dir., James Rhodes High School, 3 story, basement, 224 x 416 ft., brick, steel, concrete, West 52nd St. and Biddulph Ave. $800,000. G. M. Hopkinson, Auditorium Garage Bldg., archt. Noted Aug. 28.

Pa., Pittsburgh—Dec. 16, by Bd. Educ., J. A. Bonner, supt. Buildings, Administration Bldg., Arsenal Junior High and Elementary School, 2 and 4 story, basement, 200 x 500 ft., brick or stone, Butler and 40th Sts., also grading athletic field. Total est. $1,250,000. Contract for electrical work for school awarded to Cronenweth Electric Co., Commonwealth Annex Bldg., $34,000.

R. I., Cranston (mail Providence)—Dec. 5, by City and W. R. Walker & Son, archts., 49 Weybosset St., Providence, 2 story, basement, brick, stone, plain found., Gardner St. $150,000. Noted Nov. 13.

CONTRACTS AWARDED

Ky., Covington — Bd. Educ., 3 story, basement, 100 x 200 ft., rein.-con., brick, plain found., to G. Lubrecht, York St., $209,353. Noted Aug. 15.

Ind., Indianapolis—Bd. School Comrs., A. B. Good, bus. mgr., 150 North Meridian St., general contract School 69, 2 story, basement, rein.-con., brick, to J. G. Karstedt, 632 Architects Bldg., $114,080. Noted Nov. 6.

Ind., Jeffersonville—Bd. School Comrs., general contract Jeffersonville School, to W. A. Gutzwiller, Batesville; Port Fulton School, to Voight Corp., Jeffersonville; Ingramville School, to A. Ettel, Jeffersonville, all brick, steel. Est. $155,000. Noted Oct. 16.

La., Rayville—Richland Parish School Bd., J. A. Bell, pres., High School, 3 story, basement, rein.-con., brick, stone, also 1 story basement gymnasium, to W. M. Werner, Shreveport, $134,184. Noted Oct. 23.

Md., Baltimore—Bd. Awards, East Baltimore Junior High School, 4 story, basement, 101 x 258 ft., brick, hollow tile, structural steel, cut stone, Caroline and McElderry Sts., to Henry L. Maas & Son, Inc., 1119 Ensor St., $482,000. Noted Nov. 13.

Mass., Haverhill—M. and J. Bloomfield, Merrimac St., 2 story, basement, brick, steel academy of music, plain found., Merrimac St., separate contracts. $150,000 or more. C. V. Badger, 54 Merrimac St., archt. Noted Oct. 30.

Mass., Leominster—St. Leo's Roman Catholic Parish, M. G. Slattery, pastor, 108 Main St., 3 story, basement, brick, stone convent, plain found., to J. J. Power, Lincoln Sq., Worcester. Est. $150,000-$200,000. Noted Nov. 13.

O., Cleveland—Bd. Educ., F. G. Hogen, dir., John Marshall High School, 3 story, basement, 224 x 416 ft., brick, steel, concrete, to Crowell & Little Constr. Co., Hanna Bldg., $638,500. Noted Oct. 16.

Pa., Pittsburgh—Bd. Educ., H. W. Cramblet, secy., Administration Bldg., general contract Lincoln Elementary School, 2 story, basement, 50 x 169 ft., steel, tile, brick, rein.-con., to H. Wimer, Keystone Bldg., $205,596; heating, to John Graham Plumbing & Heating Co., 137 Bausman St., $35,000. Noted Oct. 9.

S. C., Charleston — The Citadel, Charleston, college, to Gallivan Constr. Co., Greenville. Est. $150,000.

Tenn., Nashville—**Fisk** University, 17th Ave. N., 2 story, basement, 150 x 180 ft., chemistry building, combination Gothic and skyscraper architecture, to Rock City Constr. Co., 137 Fourth Ave. N., $160,584. Noted June 5.

Wis., West Allis — Bd. Educ. (3rd unit) Washington Junior High School, 2 story, basement, 90 x 160 ft., to M. Jezo, West Allis $89,560; electrical work, to Morgan Electric Co., 422 Jefferson St., Milwaukee, $9,959; plumbing, to Wenzel & Henoch, 498 27th St., Milwaukee, $5,813; heating and ventilating, to Zuehlke-Lambrecht Co., 3026 North Ave., Milwaukee, $23,450. Grand total $128,782. Noted Aug. 21.

Ont., Forest Hill—Bd. Educ., general contract 2 story, basement, brick, stone, steel addition to Forest Hill High School, concrete found., to Gatehouse Bros. Ltd., 86 Adelaide St., E., Toronto, est. $150,000; masonry sublet, to J. R. Page, 18 Toronto St., Toronto. Forsey, Page & Steele, archts., 20 St. Clair Ave. W., Toronto, take bids later for steam heating, plumbing, electrical work.

Ont., Toronto — Toronto University, college building, to Geo. A. Fuller Co., 597 Madison Ave., New York. Est. exceeds $150,000.

Que., Montreal — Roman Catholic School Comn., 117 Ste. Catherine St., general contract Plateau School, brick, steel, Lafontaine Park, to J. A. Durocher, 675 Dunlop St. Est. $365,000.

THEATRES

PROPOSED WORK

Ariz., Phoenix—Fox West Coast Theatres, Inc., Washington and Vermont Sts., Los Angeles, Calif., soon lets contract 8 story theatre, office, $450,000. S. C. Lee, 714 West 10th St., Los Angeles, Calif., archt. Noted Sept. 4.

Calif., Los Angeles — Paramount Famous Lasky Corp., Paramount Bldg., New York, theatre, store and office building, Sunset Blvd. and Selma Ave., Vine and Argyle Sts. $2,000,000. **Maturity indefinite.** Noted June 26.

Calif., Oakland—Paramount Publix Theatres, Paramount Bldg., N. Y., soon lets contract rein.-con., steel, Bway. and Hobart Sts. $1,000,000. Miller & Pflueger, 580 Market St., San Francisco, archts. Noted Oct. 9.

Calif., Oakland—G. A. Lansbaugh, archt., 140 Montgomery St., soon takes bids general contract rein.-con., steel theatre, Bway., Franklin and 20th Sts., for Warner Bros., c/o architect. Noted Jan. 30.

Calif., Santa Ana—United Artists, c/o Balch & Stanberry, archts., Film Exch. Bldg., Los Angeles, brick, theatre, Bway. $150,000.

N. J., Garfield—B and E Amusement Co., c/o H. Gerritsen, archt., 118 Passaic Ave., sketches altering 2 story, basement, brick, steel auditorium into theatre, plain found., 100 Passaic St., $150,000.

N. Y., New York—H. S. Diamond, 123 William St., New York, theatre, stores, on 100 x 1,250 ft. site, White Plains and Lydig Aves. $450,000. Architect not selected.

Tex., Dallas—Melrose Amusement Co., plans by W. Scott Dunne, Melba Bldg., 1 story, steel, brick theatre, 3415-17 Oaklawn St. $150,000.

BANKS

PROPOSED WORK

Mass., Medford (br. Boston)—Medford Co-operative Bank, 25 High St., soon takes bids 2 story, basement, rein.-con., brick, steel, concrete found. High St. near Medford Sq. $150,000. H. A. Goodspeed, 148 High St., Boston, archts. Noted July 3.

N. Y., Syracuse—Onondaga County Savings Bank, bids late in December, general contract altering bank. $500,000. Halsey, McCormick & Helmar, Inc., 286 5th Ave., New York, archt. Noted Nov. 13.

Pa., Reading — J. J. and R. H. Greenberg, Fidelity-Phila. Trust Bldg., Phila., plans by L. Rothschild, 215 South Broad St., Phila., 15 story, basement, rein.-con., brick, steel, plain found., 6th and Penn Sts. $500,000.

BIDS ASKED

Ariz., Phoenix—Valley Bank Building, Inc., Craig Bldg., taking bids 10 story, 137½ x 150 ft., rein.-con., steel bank, office, $900,000. H. H. Green, Phoenix, archt. Morgan, Walls & Clements, 1135 Van Nuys Bldg., Los Angeles, Calif., consult. archts. Noted June 26.

CONTRACTS AWARDED

N. J., Orange—Holems & Winslow, archts., 153 East 38th St., New York, general contract 1 story, basement, brick, steel, to C. F. Coyne, 500 Linden Pl., for Orange Savings Bank, 288 Main St. $150,000. Noted Oct. 23.

OFFICES

PROPOSED WORK

Mich., Detroit—James S. Holden Co., 2150 Buhl Bldg., plans by Donaldson & Meier, 1188 1st Natl. Bank Bldg., 3 story, basement, 100 x 100 ft., brick, steel, terra cotta, concrete office, plain found., Woodward Ave. and Larned St.

N. J., Newark—HOME—Catholic Women's Diocesan Council, 30 Mulberry St., will not build home. $250,000. Project abandoned. Noted Nov. 14.

Okla., Tulsa—W. Philips, Philtower Bldg., soon lets general contract 4 story, 140 x 150 ft. top addition to present 9 story office building, known as The Philcade, 5th and Boston Sts. $500,000. Smith & Senter, Philtower Bldg., archts. Noted Oct. 30.

Ore., Portland—Mortgage Investment Co., 365 Yamhill St., plans by Claussen & Claussen, Buyers Bldg., 2 story, basement, 100 x 100 ft., brick, steel office, Morrison and 4th Sts. $650,000.

Ont., Toronto—Syndicate, c/o Sparling, Martin & Forbes, archts., Trusts & Guarantee Bldg., 14 or more stories, 66 x 106 ft., rein.-con., brick, stone office, 435 Yonge St. $350,000.

Offices (Continued)

BIDS ASKED

Mass., Boston—H. K. Ferguson & Co., contractors, Park Sq. Bldg., taking bids excavation, foundation and caissons for Professional Arts Building, Trinity Pl., Dartmouth and Stuart Sts., for New England Building, Inc., 260 Tremont St. Noted Aug. 7, under "Contracts Awarded."

N. J., Irvington (br. Newark) — W. E. Lehman, archt., 972 Broad St., Newark, bids about Feb. 15, general contract 2 story, basement, 80 x 160 ft., brick, steel office, stores, 1015-19 Springfield Ave., for U. S. Realty & Investment Co., 972 Broad St., Newark. $150,000. Grand Inc., 151 Newark Ave., Jersey City, lessee. Noted Oct. 30.

N. J., Montclair—See "Contracts Awarded."

CONTRACTS AWARDED

Mass., Boston — Tomfohrde Building, A. P. Pearce, Jr., trustee, 15 State St., 4 story, basement, brick, steel, plain found., to J. Shapiro & Son, 27 School St., $150,000. Noted Nov. 27.

Mo., Kansas City — Kansas City Power & Light Co., 14th and Grand Sts., 30 story, 100 x 131 ft. office, to Swenson Constr. Co., Shubert Theatre Bldg. Est. $2,500,000. Noted Aug. 8.

N. J., Montclair—Rudgers Builders Supply Co., 101 Greenwood Ave., 1 and 2 story, basement, 102 x 352 ft., brick, steel, rein.-con. office, garage, shop, boiler house, service rooms, Greenwood Ave., separate contracts. $150,000. Private plans. Noted Nov. 27.

Tex., Pampa—W. Worley, 5 story, 100 x 100 ft., brick, steel, rein.-con. office, to C. L. Boyington, Pampa, $137,240.

STORES

PROPOSED WORK

Calif., Los Angeles—F. & W. Grand Stores, Los Angeles, plans by Walker & Eisen, Western Pacific Bldg., 6 story, basement, 60 x 165 ft. steel, concrete, South Bway.

Mont., Great Falls—Metropolitan Building Corp., W. R. and A. W. Strain, et al., Great Falls, 3 or 4 story, basement, brick, rein.-con. store, office, apartment, 1st Ave. and North 4th St. $150,000.

N. Y., New York — One Hundred Nineteen East 37th Street Corp., J. V. Coyle, pres., 101 Park Ave., 18 story, 50 x 100 ft. store, apartment, 117 East 37th St. $500,000.

Vt., Middlebury—W. J. Rogers, plans by F. L. Austin, 240 College St., Burlington, store, office. $150,000 or more.

BIDS ASKED

Calif., Los Angeles—Trabue-Pittman Corp., Los Angeles, taking bids 2 story, basement, 70 x 140 ft., rein.-con., timber store, market, 4801-7 West Washington Blvd. $150,000. S. C. Lee, 2404 West 7th St., archt.

CONTRACTS AWARDED

Okla., Tulsa—S. H. Kress & Co., 114 5th Ave., New York, department store, to J. W. Van Horn, 526 South Kenosha St. Est. exceeds $150,000.

PUBLIC

PROPOSED WORK

Ark., Texarkana—JAIL, etc.—Miller Co., c/o J. J. Sewell, judge, plans by Witt, Seibert & Halsey, Texarkana Natl. Bank Bldg., 5 story, rein.-con., brick, steel jail and jailer's residence, Broad and Laurel Sts. $150,000 bonds voted.

Conn., Stamford—ALMS HOUSE—Town, Bd. Selectmen, will not build 3 story, basement, 85 x 185 ft., brick, concrete, steel alms house, $150,000. Coffin & Coffin, 522 5th Ave., New York, archts. Project indefinitely postponed. Noted Nov. 27, under "Contracts Awarded."

Mass., Dedham—COURT HOUSE—Norfolk Co. Court House, new court house. To exceed $150,000. Architect not selected.

Mass., Watertown — ADMINISTRATION — Town, J. P. Barrett, chn. Building Comn., sketches by R. C. Sturgis, 120 Boylston St., Boston, brick, Main St. $150,000 or more.

Mich., Detroit—POLICE STATION—Detroit Dpt. Police, Police Headquarters, 2 story, basement, brick, steel, stone, rein.-con. building, to replace present Trumbull Station, plain found., Vermont Ave. $150,000. Architect not selected.

Minn., St. Paul — WORKHOUSE — City, M. Rosen, comr. P. Wks., City Hall, plans by C. A. Bassford, City Hall, 3 or 4 story, basement, rein.-con., brick, near Como Park. $600,000.

New York—PRISON—Dpt. Correction, State Office Bldg., Albany, new prison group.

New York—INSTITUTION—Dpt. Correction, State Office Bldg., Albany, new institution for defective delinquents.

Okla., Blackwell—LIBRARY—City, plans by Hawk & Parr, 1st Natl. Bank Bldg., Oklahoma City, 2 story, Bridge St. $150,000.

Wis., Waukesha—COURT HOUSE—Waukesha Co., plans by Clas & Clas, 44 Milwaukee St., Milwaukee, court house addition. $200,000.

Ont., Toronto—OFFICE—Dpt. P. Wks., East Blk., Parliament Bldgs., 6 story, basement, rein.-con., stone government office building. $1,000,000.

BIDS ASKED

Conn., Simsbury—HALL—Town, Town Clerk, Town Hall, taking bids 2 story, basement, 160 x 200 ft., brick memorial hall, $350,000. Smith & Bassette, 36 Pearl St., Hartford, archts. Noted Sept. 29.

Ill., Chicago—LIBRARY—Dec. 19, by Bd. Directors Chicago Pub. Library, H. G. Wilson, secy., Chicago Public Library Bldg., branch library, Michigan Ave. and 48th St. $150,000 incl. equipment.

Md., Baltimore—LIBRARY—Dec. 17, by Bd. Awards, City Hall, 7 story, 150 x 300 ft., brick, rein.-con., cut stone, limestone, steel (Enoch Pratt Free Library), Cathedral, Mulberry and Franklin Sts. $2,000,000. H. Massart, 328 North Charles St., engr. C. N. and N. Friz, Lexington Bldg., archts. E. L. Tilton & A. M. Githens, 141 East 45th St., New York, assoc. archts. Noted May 30.

N. Y., Dannemora—CELL BLOCK—Dec. 19, by Dpt. Correction, State Office Bldg., Albany, construction, prison steel work, East Cell Block, new Segregation Building, laundry and bath building, Clinton Prison; adv. E. N.-R. Dec. 4. Noted Oct. 30.

Okla., Stillwell—COURT HOUSE—Dec. 16, by S. J. Starr, clk. Adair Co., 3 story, basement, 76 x 110 ft., Main St. $150,000. Huseman & Co., Chickasha, engr.

Pa., Pittsburgh—JUVENILE COURT HOUSE—Dec. 16, by Bd. Comrs. Allegheny Co., City-County Bldg., J. G. Armstrong, chn., 3 story, basement, 125 x 139 ft., brick, steel, stone, 3333 Forbes St. $325,000. S. L. Roush, 519 Smithfield St., archt. Noted Jan. 16.

Tex., Graham—COURT HOUSE—Dec. 12, by Young Co., c/o W. F. Parsley, judge, 3 story, basement, 84 x 122 ft., Indiana limestone, marble, Square. $200,000. Withers & Thompson, 201 Holmes Bldg., Fort Worth, archts.

BUILDINGS—UNCLASSIFIED

PROPOSED WORK

Calif., Pomona — NEWSPAPER — Progress-Bulletin, sketches L. Rogers, 2412 West 7th St., Los Angeles, 3 story, basement, 119 x 120 ft., rein.-con., timber, incl. office, 3rd and Thomas Sts. $175,000.

La., Opelousas—CITY HALL and THEATRE—J. B. Carroll, Leesville, plans by I. C. Carter, Lake Charles, 2 story, 31 x 50 ft. city hall (leased to city); 90 x 125 ft. theatre. $265,000.

Md., Baltimore—HOME—Grand Lodge of Masons, Charles St., plans by W. W. Emmart, Union Trust Bldg., 3 story, stone, York Rd. $600,000.

Mass., Great Barrington — COMMUNITY — Town, G. Church, chn. com., sketches by Towner, Sellew & Associates, 329 Main St., Middletown, community building, incl. auditorium, gymnasium, swimming pool, bowling alleys, cafeteria, School and Bridge Sts. $150,000.

Mass., Watertown—POLICE STATON—Town, police station, Saltonstall Park Sect. $150,000. Architect not selected.

Mass., Worcester—MEMORIAL—City plans by F. C. Hirons, 40 East 49th St., New York, and L. W. Briggs & Co., Worcester, war memorial auditorium, Salisbury and Highland Sts. $2,000,000.

N. J., Elizabeth—HOME—Home for Aged Women, 1073 East Jersey St., brick, steel, West Jersey St. and De Hart Pl. $150,000. Architect not selected.

N. J., Irvington (br. Newark) — POLICE HEADQUARTERS—Bd. Town Council, Township Hall, bids about Feb. 1, 2 story, basement, brick, steel addition, Washington Ave. $150,000. G. F. Lederer, 2 Union Ave., Irvington, archt. Noted Oct. 9.

N. J., Newark—OFFICE—Eagle Fire Insurance Co., E. W. Fort, genl. mgr., 18 Washington Pl., 3 story, basement, brick, steel office, Washington Pl. and Halsey St. $150,000.

N. Y., New York—EXCHANGE—New York Telephone Co., 1775 Grand Concourse, soon lets contract, general contract exchange, Trauman and Rowland Aves. $300,000. Voorhees, Gmelin & Walker, 101 Park Ave., archts. Noted Nov. 20.

Nev., Las Vegas — DEPOT — Union Pacific R.R. Co., H. C. Mann, ch. engr., 1416 Dodge St., Omaha, Neb., sketches depot. $200,000.

N. J., Trenton—MARINE TERMINAL—City Comn. soon takes bids marine terminal along Delaware River, South Trenton. $450,000. Architect not selected. Noted Nov. 21.

O., Cincinnati — STATION, etc. — Cincinnati Union Terminal Ry., Temple Bar Bldg., plans by Felheimer & Wagner, 155 East 42nd St., New York, and takes bids after Feb. 15, general contract station and platform. To exceed $4,000,000. Noted June 14, 1928.

O., Cleveland—MAUSOLEUM and CHAPEL—Crown Hill Cemetery, Inc., C. W. Beck, treas., Terminal Tower, revised plans by Lovell & Lovell, 224 East Ontario St., Chicago, Ill., granite, marble, steel, rein.-con., Twinsburg Rd. $200,000. Noted July 3.

O., Cleveland—MAUSOLEUM, etc.—Hillcrest Memorial Park, F. I. Lewis, 1102 Swetland Bldg., plans by W. F. Watts, 11020 Swetland Bldg., 1 and 2 story, stone, steel, marble, granite, rein.-con. mausoleum, chapel, tower, South Miles and Solon Rds. $150,000.

BIDS ASKED

N. J., Trenton—PASSENGER STATION—Pennsylvania R.R. Co., T. J. Skillman, ch. engr., Broad St. Sta., Phila., Pa., bids about Feb. 15, general contract 2 story, basement, brick, steel railroad station. $150,000. E. A. Dennison Assoc., 40 East 49th St., New York, archts. Noted Oct. 23.

R. I., Providence—HOME—Jewish Home for Aged, J. Hahn, taking bids 2 story, basement, brick, stone, plain found., Morris Ave. $150,000. Krokyn & Browne, 120 Milk St., Boston, Mass., archts. Noted Oct. 30.

CONTRACTS AWARDED

Ga., Atlanta — EXCHANGE — Southern Bell Telephone & Telegraph Co., Hurt Bldg., general contract 3 story, 56 x 94 ft., brick, rein.-con. addition, Crescent Ave., to Barge-Thompson, Ellis St.

Mass., Boston — MERCANTILE — C. W. Whittier & Bros., 82 Devonshire St., rebuilding 6 story, basement, brick, plain found., recently destroyed by fire, 18-28 Sudbury St., to F. Martin & Son, 28 Oak St. Est. $150,000.

N. J., West Collingswood—HOME—Excelsior Consistory, A.A.S.R., general contract Buff brick, limestone, granite, White Horse Pike, to F. V. Warren Co., 16th and Locust Sts., Phila., Pa. Est. $250,000.

Buildings

FACTORIES AND MILLS

PROPOSED WORK

Conn., Bristol—FACTORY—Bristol Co., S. R. Bristol, Waterbury, plans by E. A. Webster, 51 West Main St., Waterbury, altering and constructing 2 story addition, Platts Mills. $50,000.

Conn., Fairfield — FACTORY — McKesson & Robbins, Inc., Grasmere, Fairfield, plans by Fletcher-Thompson, Inc., 1336 Fairfield Ave., rein.-con. addition. $100,000.

Conn., New Britain — FACTORY — Eastern Malleable Iron Co., Inc., 63 Main St., 2 story, brick addition, John St. $40,000 or more. Project in abeyance. M. J. Unkelbach, 52 Main St., archt. Noted Oct. 2.

Ind., Bedford—STONE MILL—Bedford Cut Stone Co., sketches steel mill, S. St. $50,000. Private plans.

Ind., South Bend—PLANT—South Bend Current Controller Co. sketches brick, steel plant. $50,000. Private plans.

La., Westwego—COLD STORAGE PLANT—C. H. Free, mgr. Louisiana Ice & Coal Co., 1121 Julia St., New Orleans, soon lets contract 35 x 56 ft. brick, concrete addition, incl. 8 x 35 ft. platform. F. I. McCandlich, Jackson, Miss., ch. engr.

La., Crowley—ICE PLANT—Louisiana Public Utilities Co., Lafayette, sketches rein.-con., brick. $50,000.

Minn., Minneapolis—INDUSTRIAL PLANT—Bd. P. Welfare, City Hall, industrial plant, at municipal workhouse, Parkers Lake. $50,000-$100,000. Architect not selected.

Mo., St. Louis—BOTTLING PLANT, etc.—Anheuser Busch, 721 Pestlozi St., rebuilding bottling plant, storage and distribuiton building, destroyed by fire. To exceed $100,000. Private plans.

N. J., East Orange—DIE CASTING FACTORY—C. M. Grey Mfg. Co., 358 Central Ave., brick, Central Ave. between Nassau St. and Shepard Ave. $40,000.

N. J., Newark—WOODWORKING PLANT—M. N. Shoemaker, archt., 10 Bleeker St., rejected bids general contract 3 story, basement, 50 x 100 ft., brick, plain found., New York Ave., for J. C. Kohaut, Inc., 117 Green St. Est. $40,000. **Maturity indefinite.** Noted Aug. 21.

N. Y., Stapleton (sta. Staten Island) — BREWERY, etc. — Rubsam & Harrman Brewing Co., 191 Canal St., soon lets contract brewery, ice manufacturing, storage. $300,000. Noted Oct. 9.

O., Canton—FACTORY—J. L. Douglas, mgr. Mirific Products Co., Granite City, Ill., and Canton, 1 story, brick, Wheeling & Lake Erie R.R. $40,000. Private plans.

O., Cleveland—FACTORY—Bryant Heater & Mfg. Co., J. E. Kinner, pres., 17225 St. Clair Ave., plans by Fox, Duthie & Foose, 1936 Union Trust Bldg., brick, steel additions. $200,000.

Okla., Norman—ICE and ICE CREAM PLANT—J. R. Newkumet sketches ice and ice cream plant. $40,000. Private plans.

Oklahoma — AIRCRAFT MANUFACTURING PLANT—Bird Aircraft Corp., 17 Haverkamp St., Glendale, N. Y., plant at Oklahoma City or Tulsa. Estimated to exceed $40,000.

Okla., Chickasha—GAS COMPRESSOR STATION—Southwest Light & Power Co., Braniff Bldg., Oklahoma City, D. Parks, mgr., sketches natural gas compressor station. $40,000. Private plans.

Pa., Erie—RAG WAREHOUSE—H. F. Watson Paper Co., 143 East 16th St., subsidiary Ruberoid Co., M. Rubbin in charge, 95 Madison Ave., New York, soon lets contract 1 story, 80 x 200 ft. warehouse, 33 ft. high, and 46 x 128 ft. cutting building, East 16th St. $40,000. Private plans. Noted May 15.

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Factories and Mills (Continued)

Pa., Meyersdale—SHIRT FACTORY—Philips Jones Corp., W. J. Diever, gen. mgr., Pottsville, sketches 2 or 3 story, 66 x 200 ft., probably concrete block. $40,000 Private plans. **Maturity indefinite.**

Pa., Monessen—ICE PLANT—Western Ice & Utilities Co., J. M. Whitsett, genl. mgr., Donora, sketches ice plant. **Probably Maturity soon.** Architect not selected.

Pa., Uniontown—SHIRT FACTORY—Michael Berkowitz Co., Inc., A. Fisher, in charge, 170 5th Ave., New York, plans sketches by E. B. Johnson & H. W. Altman, Fayette Title & Trust Bldg., Uniontown, 2 story, 55 x 435 ft., 50,000 sq.ft. floor space, brick, steel, hollow tile.

R. C., New Westminister—SHINGLE MILLS—Bloedel, Stewart & Welch Ltd., shingle mills. $200,000.

BIDS ASKED

Ind., Ft. Wayne—PLANT—Fisher Bros. Paper Co., 118-20 West Columbia St., bids about Dec. 20, 3 story, basement, 30 x 150 ft., rein.-con., brick, steel. $40,000. A. M. Strauss, 415 Cal-Wayne Bldg., archt. Noted Nov. 13.

Me., Waterville — PLANT — See "Contracts Awarded."

Mass., Watertown—FACTORY—New England Telephone & Telegraph Co., 245 State St., Boston, taking bids brick, steel. To exceed $40,000. Monks & Johnson, 99 Chauncy St., Boston, archts. Western Electric Co., 379 Summer St., Boston, lessee.

N. J., Elizabeth—SHIRT FACTORY—See "Contracts Awarded."

N. J., Jersey City—CHEMICAL PLANT—Dec. 1, by H. W. Andrews, engr. and archt., 15 East 40th St., New York, general contract 2 story, basement, 75 x 155 ft., brick, steel chemical plant, West Side Ave., for Mallinckrodt Chemical Wks., West Side Ave. Est. $40,000.

N. J., Paterson—DYE HOUSE—See "Contracts Awarded."

O., Youngstown — DAIRY PLANT, etc. — Youngstown Sanitary Mills Co., 715 Erie St., taking bids 2 and 1 story, 43 x 121 ft. dairy plant, and 30 x 55 ft. power house, both brick, steel, concrete. $100,000. Braziell & Anderson, 309 Fowill Ave., Pittsburgh, Pa., archts.

Pa., Charleroi—ICE PLANT—See "Contracts Awarded."

Wash., Seattle — ASSEMBLY PLANT — Dec. 16, by A. Kahn, archt., 1000 Marquette Bldg., Detroit, Mich., 1 and 2 story, basement assembly plant and oil house for assembly of automobiles, for Ford Motor Co., 3674 Schaefer Rd., Dearborn, Mich. $500,000. Noted Nov. 13.

CONTRACTS AWARDED

Calif., Emeryville—FACTORY—Westinghouse Electric & Mfg. Co., 1 story, brick, steel addition, Powell St., to Cahill Bros., 206 Sansome St., San Francisco, $40,000.

Calif., Oakland—FACTORY—Samarkand Ice Cream Co., 893 Folsom St., San Francisco, 1 story, mezzanine, concrete, 18th and Peralta Sts., to Cahill Bros., 206 Sansome St., San Francisco, $45,000.

Me., Waterville — PLANT — Harris Baking Co., North St., 2 story, brick, bakery plant, North St., separate contracts. $40,000. Private plans.

Mass., Everett—BAKERY—S. Piantedosi, 83 Main St., 1 story, basement, brick, concrete, steel, concrete found., to Concrete Constr. Co., 11 Garfield Ave., Chelsea. $40,000-$50,000. Noted Sept. 4.

Mass., Malden (br. Boston)—MANUFACTURING—E. J. Lamothe Co., 25 Chestnut St., Somerville, 1 story, 100 x 140 ft., brick, concrete, steel, plain found., Willis Ave. and Green St., to R. J. Gauvreau & Co., 11 Beacon St., Boston. Est. $50,000. Noted Nov. 6.

Mass., Roxbury (sta. Boston)—LAUNDRY—National Coat & Apron Supply Co., 1310 Columbus Ave., altering and constructing 2 and 3 story, irregular sized, brick, steel addition, plain found., to J. I. Black Co., 44 Pierpont Rd., West Roxbury. Est. $40,000.

Mass., Tully—FACTORY—F. C. Warwick & Co., Tully, altering and constructing 2 story, brick, timber addition, to Taylor-Wheeler Co., Railroad Pl., Athol. Est. $40,000.

Miss., Columbia—CANNING PLANT—Dorgan-McPhillips Packing Co., Mobile, Ala., 80 x 250 ft. corrugated walls, structural steel frame, rein.-con. found., to Dye & Mullings, Columbia.

Neb., Lincoln—SERVICE and WAREHOUSE—International Harvester Co. of American, 606 South Michigan Ave., Chicago, Ill., 1 story, 110 x 450 ft., brick, steel, stone, to W. J. Assenmacher Co., 625 North 17th St. Noted Nov. 27.

N. J., Elizabeth—SHIRT FACTORY—Fordham Shirt Co., 604 Fulton St., 2 story, basement, brick, steel addition, plain found., separate contracts. $40,000. L. Quien, Jr., 229 Broad St., archt.

N. J., Hoboken—FACTORY—Gatti Paper Stock Corp., 13th and Monroe Sts., general contract 2 story, basement, 90 x 195 ft., brick, steel, to Auf der Heide Contg. Co., 443 16th St., West New York; steel, to Oliner Iron Wks., Manhattan Ave., Jersey City. Est. $40,000. Noted Oct. 16.

N. J., Paterson — DYE HOUSE — Radiance Piece Dye Wks., Inc., 373 North 11th St., Prospect Park, general contract 1 story, basement, 50 x 200 ft., brick, steel, East 25th St., separate contracts. $40,000. E. R. Coe, 136 Washington St., Paterson, archt. **Noted Nov. 6.**

N. J., Trenton—POTTERY PLANT—Lockwood, Greene Engineers, Inc., engrs. and archts., 100 East 42nd St., New York, general contract 1 story, 40 x 200 ft., brick, steel, to S. W. Mather & Son, 300 Maple Ave., for Trenton Potteries Co., North Clinton Ave. Est. $50,000. **Maturity indefinite.** Noted Nov. 27.

O., Cleveland—COOLER—H. Kreinberg & W. A. Krasny, 3310 West 65th St., 1 story, basement, 40 x 150 ft., brick, rein.-con., 3310 West 65th St., to Tepper & Limovitz, 3463 East 123rd St. Est. $50,000.

O., Cleveland—FACTORY—Schwenger-Klein Co., S. J. Schwenger, pres., 5201 Denison Ave., 1 and 2 story, 40 x 50 ft. and 40 x 80 ft., brick, steel additions, to M. Legs, 2268 Ardleigh Rd. Est. $40,000.

Pa., Altoona—BULK PLANT—Sun Oil Co., W. A. Courtney, engr. in charge, Sun Bldg., Phila., 1 story, 45 x 65 ft., concrete, brick, steel, incl. full sized plant, 6 car garage, warehouse, pump house, office, to Hughes Foulkrod Co., Schaff Bldg., Phila., and Stevenson Foster Bldg., Pittsburgh.

Pa., Brownsville—BULK PLANT—Sun Oil Co., W. A. Courtney, engr. in charge, Sun Bldg., Phila., 1 story 45 x 65 ft., steel, brick, concrete, incl. full sized plant, 6 car garage, warehouse, office, pump house, to Hughes Foulkrod Co., Schaff Bldg., Phila., and Stevenson Foster Bldg., Pittsburgh.

Pa., Charleroi—ICE PLANT—Western Ice & Utilities Co., J. M. Whitsett, genl. mgr., Donora, ice manufacturing plant, day labor.

Pa., Clairton—BAKERY—Clairton Baking Co., State St., general contract 1 story, basement, 54 x 107 ft., brick, hollow tile, concrete, State St., to N. LeDonne, 539 8th St. Est. $40,000. General contractor taking bids sub-contracts.

Pa., Greensburg—BULK PLANT—Sun Oil Co., W. A. Courtney, engr. in charge, Sun Bldg., Phila., 1 story, steel, brick, concrete, incl. oil and pump house, separate boiler house addition, using existing building for garage and office, to Hughes Foulkrod Co., Schaff Bldg., Phila., and Stevenson Foster Bldg., Pittsburgh.

Pa., New Brighton—FACTORY—W. Leard Co., Inc., 4th St., 1 story, 40 x 109 ft., steel and sheeting, to Pittsburgh Bridge & Iron Co., Fulton Bldg., Pittsburgh.

R. I., Auburn—PLANT—Universal Winding Co., 2 story, brick, steel addition, plain found., to A. F. Smiley Constr. Co., 210 Main St., Pawtucket. Est. $45,000.

Wash., Longview—PULP MILL—Weyerhuaser Timber Co., A. L. Raught, mgr., 150 ton bleached sulphite pump mill, to C. Kuppler Sons Co., Port Angeles. Noted Aug. 14.

Ont., Oshawa—FLOUR MILL—Vitamin Milling Co. of Canada Ltd., 19 Melinda St., Toronto, 59 x 60 ft. frame flour mill, at Oshawa Harbor, to T. B. Mothersill & Co., Simcoe St., $40,000.

GARAGES

PROPOSED WORK

Mass., Quincy—Corey Bros., Shaw St., receiving sketches 1 story, concrete steel public garage, Washington St. $50,000. Architect not selected.

N. Y., New York—Realty Utilities Corp., F. A. Shaw, pres., 122 East 42nd St., 75 x 173 ft. service garage, Jerome Ave. and 196th St. $40,000. N. Rotholz, 122 East 42nd St., archt. **Maturity about Mar. 1.** Noted Nov. 13.

Wash., Tacoma—Pacific Avenue Building Co., D. L. East, pres., rein.-con. storage garage, Pacific St. and 11th Ave. $175,000.

CONTRACTS AWARDED

Ind., Michigan City—Lincoln Oil Co., general contract rein.-con., brick, steel, terra cotta super-service station, to H. Koeln, Michigan City. Est. $40,000.

Mass., Charlestown (sta. Boston) — A. J. Wilson, c/o B. Brown, engr., 65 Franklin St., Boston, altering and constructing 1 story, 90 x 130 ft., brick, concrete, steel garage addition, 39 Miller St., to Archdeacon & Sullivan, 1742 Washington St., Boston. Est. $40,000. Noted Nov. 20.

Neb., Omaha—Union Pacific R.R. Co., G. J. Adamson, ch. engr., 15th and Dodge Sts., 2 story, basement, 158 x 300 ft. garage, repair shop and bus depot, to P. Kiewit's Sons, Omaha Natl. Bank Bldg.; plumbing, to J. Martig, 5616 Binney St.; electrical wiring, to E. C. Bennett Electric Co., 106 South 18th St. Noted Mar. 27.

Pa., Pittsburgh—Dixon Motor Co., W. J. Dixon, mgr., 109 Montgomery Ave., 1 story, 50 x 120 ft., brick, hollow tile, 109-11 Montgomery Ave., to J. F. Haldeman, Whitfield Bldg. Est. $40,000.

SHOPS AND FOUNDRIES

PROPOSED WORK

Ind., Crawfordsville — MACHINE SHOP, etc. —B. Remley plans by C. Beeson, Crawfordsville, 82 x 130 ft., rein.-con., brick, steel machine shop, garage, 120 West Market St. $40,000.

N. Y., Buffalo — FORGE SHOP — Niagara Falls Smelting & Refining Co. soon lets contract forge shop, 2208 Elmwood Ave. To exceed $40,000 incl. equipment.

CONTRACTS AWARDED

Pa., Farmers Valley (mail Smethport) — FILTER HOUSE and BURNER—McKean C. Refining Co., W. H. Rockman, in charge, general contract steel and asbestos siding, 12 filter and conveyors, to L. O. Bouquin Co., 11 East 1st St., Oil City. Est. $40,000.

Tenn., Memphis—MACHINE SHOP and GARAGE—Shelby Co. Institutions Comm., E. W. Hale, chn., machine shop, garage at County Work House, to L. E. Joyner, 63 South 3rd St. $64,675.

POWER PLANTS

PROPOSED WORK

Colorado—Pub. Serv. Co. of Colorado, 15th and Champaign Sts., Denver, expending $1,000,000, improvements, additions to steam and hydro plants at Sterling, Grand Junction, Alamosa, Boulder Canyon and Shoshone; putting distribution lines and certain deeders underground in Denver.

Ga., Augusta—City, complete new power plant $1,000,000. Burns & McDonnell Eng. Co., 400 Interstate Bldg., Kansas City, Mo., engrs.

Mass., Everett—Edison Electric Illuminating Co., 49 Boylston St., Boston, concrete, brick, steel power plant, switching house extension at Mystic Station, Alford and Dexter Sts. $3,000,000. Stone & Webster, 49 Federal St., Boston, engrs.

N. H., Exeter—See "Schools."

O., Youngstown—See "Factories and Mills."

Okla., Watonga—City, G. Thomas, city clk., sketches municipal light plant. $100,000. L. Boughton, Watonga, engr.

Wis., Two Rivers—City, new power plant. Burns & McDonnell Eng. Co., 400 Interstate Bldg., Kansas City, Mo., engrs. $40,000.

Que., Mnot Laurier—Town Council, improving power plant, installing turbines, generators. $260,000. S. Quimet, 706 St. Gabriel St., Montreal, engr.

BIDS ASKED

Mass., Newburyport—City, H. W. Little, city clk., taking bids 1 story, brick, boiler house, heating plant, clam purification plant at Plum Island. $40,000-$50,000.

Ont., Woodstock—See "Contracts Awarded."

CONTRACTS AWARDED

Ind., Butterville — State of Indiana, Indianapolis, brick, steel power plant for School of Feeble Minded. $50,000. Owner builds. O. B. Little, 307 North Illinois St., Indianapolis, archt.

La., Pineville — Tooke & Reynolds Co., Arcadia, 1 story, rein.-con., brick power plant, distribution system, to Tudor & Ratcliff, Alexandria. Est. $175,000.

Ont., Woodstock—Hydro-Electric Power Comn. of Ontario, 190 University Ave., Toronto, duplicate switching and transforming equipment in substation, day labor. $350,000. F. A. Gaby, 190 University Ave., Toronto, engr.

WAREHOUSES

PROPOSED WORK

La., New Orleans—Southern Pacific R.R. Co., 65 Market St., San Francisco, G. W. Boschke, ch. engr., terminal warehouse, incl. refrigeration. $800,000.

N. J., Newark — New Jersey Bell Telephone Co., 540 Broad St., 6 story, basement, brick, steel warehouse, garage, Fabyan Pl. and Loretta Ave. $250,000.

N. J., Perth Amboy—Greenspan Bros., warehouse, 100,000 sq.ft. floor space. $200,000.

N. Y., Brooklyn—H. K. Ferguson Co., owner and lessee, H. J. Jacoby, ch. engr., 25 West 43rd St., New York, storage, Jay, Plymouth and Water Sts. $150,000. Private plans.

BIDS ASKED

Calif., San Francisco—H. C. Baumann, archt., 251 Kearny St., taking bids 3 story, basement, rein.-con. warehouse, Sansome St., for Poultry Producers of Central California, 700 Front St. $150,000.

Conn., East Hartford (br. Hartford)—Dec. 12, by Texas Co., 31 St. James Ave., Boston, Mass., 40 x 90 ft. warehouse and boiler unit, 42 x 80 ft. garage, and two 15 x 16 ft. pump houses, rein.-con., brick. $50,000. Private plans.

CONTRACTS AWARDED

Calif., Los Angeles—Overhead Terminal Warehouse Co., c/o S. H. Dunford, archt., 5860 Avalon Blvd., 6 story, basement, 100 x 620 ft., steel, rein.-con., incl. loading platform, spur tracks, ramps, 9th and Alameda Sts., to J. V. McNeil Co., 5860 Avalon Blvd., $1,000,000.

Conn., Willimantic—Rockville-Willimantic Lt. Co., 850 Main St., altering and constructing 1 story, brick concrete, steel storehouse addition and garage, off Railroad Ave., to J. C. Boycher Co., 237 Valley St. Est. $40,000-$50,000.

Md., Baltimore—C. H. Osborne, engr., 222 West Franklin St., 6 story, 115 x 125 ft., brick, steel, concrete warehouse, Conway St. near Light St., to Morrow Bros., Fidelity Bldg., for Tobacco Growers Assn., c/o engineer. Noted Oct. 9.

Wis., Milwaukee—Terminal Warehouse Co., 106 Seeboth St., concrete work for 5 story, 62 x 120 ft. cold storage warehouse, to Selser-Ornst Co., 444 State St., Wauwatosa. Noted Nov. 20.

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